SEPT 1982

THEMATIC MAPPER

Prepared for
GODDARD SPACE FLIGHT CENTER
Greenbelt, Maryland 20771
CONTRACT NAS 5-24200

FLIGHT MODEL
PRESHIPMENT REVIEW
DATA PACKAGE
VOLUME II - SUBSYSTEM DATA
PART C

Article IV - 3A

HUGHES
HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP

HS 236-0019-1679

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SPACE AND COMMUNICATIONS GROUP

Hughes Ref No. D4598-

THEMATIC MAPPER

FLIGHT MODEL

PRESHIPMENT REVIEW

VOLUME II

SUBSYSTEMS

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THEMATIC MAPPER

FLIGHT MODEL

PRE SHIPMENT REVIEW

VOLUME II

SUBSYSTEMS

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2.0 Subsystems Acceptance Data

Each of the major subsystems of the Flight Model Thematic Mapper was reviewed as an entity prior to integration into the system. The intent of this section is to present for each major subsystem, acceptance data for the subsystem (test results); reference lists of the configuration status; and reference lists of Non-Conforming Material Reports, Failure Reports (with copies), and Requests for Deviation/Waiver (with copies).

The acceptance data for each subsystem (where applicable) is contained in the Appendix to this report, as referenced in the first subsection for each subsystem.

The second subsection for each subsystem contains a tabular summary of the "as designed" and "as built" configuration lists, showing all applicable drawings, specifications, or standards. (An "as built" configuration list for the total system is included in Volume I and is also included herein immediately following this page). This is followed by a listing of all items against the subsystem, with copies of NCRM's, RT's, and RD/W's.

SUMMARY

AS-BUILT CONFIGURATION LIST

TM FLIGHT S/N 003

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
1	51065	THEMATIC MAPPER ASSY	J	J	J	003
			4257A	4257A	4257A	
			4487A	4487A	4487A	
			4557A	4557A	4557A	
			4573A	4573A	4573A	
			4643A	4643A	4643A	
			4658A	4658A	4658A	
			D143R1	D143R1	D143R1	
			D144	D144	D144	
			D146	D146	D146	
			D148	D148	D148	
			D155	D155	D155	
			D158	D158	D158	
			D161	D161	D161	
			D162	D162	D162	
			D163	D163	D163	
			D164	D164	D164	
			D165	D165	D165	
			W166	W166	W166	
			W169	W169	W169	
			W170	W170	W170	
			W171R1	W171R1	W171R1	
			W173	W173	W173	
2	50840	MAIN FRAME ASSY	E	E	E	003
2	52347	ELECTRONICS MODULE ASSY	D	B	B	201
			4588A	4091A	4091A	
				4113A	4113A	
				4242A	4242A	
				4293A	4293A	

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERT NUMB
3	3533003-100	MULTIPLEXER ASSY	C 43009 43074 65661 65662 W124 W125	C 43074 65661 65662 W124 W125	C 43009 43074 65661 65662 W124 W125	003
3	50869	POWER SUPPLY ASSY	D 2015A 2039A 4347A D030 D068 W074 W092 W093 W101	D 2015A 2039A 4347A D030 D068 W074 W092 W093 W101	D 2015A 2039A 4347A D030 D068 W074 W092 W093 W101	004
3	52348	CABLE ROUTING ASSY	F 3844A	F 3844A	F 3844A	005
2	52532	OPTICAL ASSY	F 3174A 4100A 4187A 4266A 4488A 4559A 4656A D-151 D-154 W-148	F 3174A 4100A 4187A 4266A 4488A 4559A 4656A D-151 D-154 W-148	F 3174A 4100A 4187A 4266A 4488A 4559A 4656A D-151 D-154 W-148	003
3	51512	AFT OPTICS ASSY	E 3646A 3925A 3959A 4585A	D 3646A 3896A 3925A 3959A 4134A	D 3646A 3896A 3925A 3959A 4134A	003

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
4	50795	PRIME FOCAL PLANE ASSY	J	H	H	201
			W126	3934A	3934A	
				3963A	3968A	
				3982A	3982A	
				W126	W126	
3	51200	RADIATIVE COOLER ASSY	E	E	E	003
			3922A	3922A	3922A	
			4201A	4201A	4201A	
			4216A	4216A	4216A	
			4269A	4269A	4269A	
			SB-W032	SB-W032	SB-W032	
			W144	W144	W144	
			W147	W147	W147	
			W149	W149	W149	
			W151	W151	W151	
4	50973	COLD FOCAL PLANE ASSY	B	B	B	201
			2870A	2870A	2870A	
			3895A	3895A	3895A	
			4173A	4173A	4173A	
			SB-D004	SB-D004	SB-D004	
			W102R1	W102R1	W102R1	
			W109	W109	W109	
			W111	W111	W111	
			W134	W134	W134	
			W135	W135	W135	
3	51337	TELESCOPE ASSY	D	D	D	002
			3866A	3866A	3866A	
			3917A	3917A	3917A	
			W129	W129	W129	
			W136	W136	W136	

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
3	52534	RELAY OPTICS ASSY	D 1145A 4097A	D 1145A 4097A	D 1145A 4097A	003
2	3533002-100	SCAN MIRROR ASSY	E	D 13121 13122 64358 64363 64369 64374 W020	D 13121 13122 64358 64363 64369 64374 W020	004

SECTION 2.11
RELAY OPTICS

2.11.1 Relay Optics

2.11.1.1
No performance data was taken at the subsystem level on this subsystem.

2.11.2
Acceptance Data

2.11.2.1
Configuration Lists

AS-BUILT CONFIGURATION LIST

RELAY OPTICS ASSY

P/N 52534 S/N 003, FLIGHT

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
1	52534	RELAY OPTICS ASSY	D + 1145A 4097A	D + 1145A 4097A	D + 1145A 4097A	003
2	50845	RELAY OPTICS BASE	C	C	C	003
2	50846	RELAY OPTICS HOUSING	D	D	D	003
2	51339	FOLDING MIRROR ASSY	A	A	A	003
3	50857	MIRROR, FOLDING	B	B	B	005
2	51340	SPHERICAL MIRROR ASSY	A	A	A	003
3	50855	MIRROR, SPHERICAL RELAY	B	B	B	005
2	51342	TRANSLATOR, INCHWORM	B + 9721	B + 9721	B + 9721	5426 5428 5436
2	53412	THERMISTOR ASSY	B + 1120A 3801A	B + 1120A 3801A	B + 1120A 3801A	202
2	53414	TRANSFORMER ASSY	A	A	A	204 205 206
2	53744	ELECTRONIC ASSY, RIGHT BANK-IPS	A + 9552 9710 2924A 3817A	A + 9552 9710 2924A 3817A	A + 9552 9710 2924A 3817A	201
2	53753	ELECTRONIC ASSY, LEFT BANK-IPS	B + 3810A	A + 9551 1842A 2949A 3810A	A + 9551 1842A 2949A 3810A	201

DL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
	53749	ELEX ASSY-OUTPUT ASSY-IPS	C + 3808A	C + 3808A	C + 3808A	201 202 203
	52024-1	PWB ASSY-IPS	B	A + 7579 8385 8669 8964 9040	A + 7579 8385 8669 8964 9040	107 108 109 201 205 209
	52024-2	PWB ASSY-IPS	B	A + 7579 8385 8669 8964 9040	A + 7579 8385 8669 8964 9040	102 104 105
	52029	PWB ASSY-IPS	B	B	B	104 202 203
	53746	ELEX ASSY-OUTPUT PWB-IPS	A + 9597 9682 1706A	A + 9597 9682 1706A	A + 9597 9682 1706A	102 201 203
	53757	ELEX ASSY-REGULATOR MODULE	B + 3916A 4116A	A + 9277 9865 1289A 2086A 2102A 3916A 4116A	A + 9277 9865 1289A 2086A 2102A 3916A 4116A	201
	53754	ELEX ASSY-100V REGULATOR	A + 9862 1705A D039R1	A + 9862 1705A D039R1	A + 9862 1705A D039R1	201

P/N 52534

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
4	52041	PWB ASSY, XFMR-MOUNTING	B	A + 8673 9256 9731 9828 1704A 1717A	A + 8673 9256 9731 9828 1704A 1717A	205
5	50875	CHOKE	B	A + 8443 1356A	A + 8443 1356A	F104

W D Cullen 3-25-82
Quality Assurance

E Dergarc 3-25-82
Configuration Management

Listing of Liens

RELAY OPTICS

P/N 52534

FLIGHT

Failure Reports Number

Open	Closed
	F0553
	F0555
	F1669
	F1744
	F1747
	F1748

Deviation	Waivers

RELAY OPTICS

P/N 52534

FLIGHT Failure Report No.		PROTOFLIGHT Failure Report No.		ENGINEER Failure Report No.	
Open	Closed	Open	Closed	Open	Closed
	F0553		F0584		F0511
	F0555		F1708		F0514
	F1669		F1710		F0519
	F1744		F1711		F0520
	F1747		F1762		F0526
	F1748		F1763		F1731
			S8011		
			S8046		

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FAILURE REPORT

F 0553

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM
2. GLA:
3. MODEL: E-1
4. TIME OBSERVED: 16:00
5. DATE OBSERVED: 2-25-82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT		~~5512~~	~~003~~	
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	RELAY OPTICS ASSY	52534	003	
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☒ IN-PROCESS ☐ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ____ ° ____ ☐ THERMAL VAC ____ HRS. AT ____ ° ____ . ☐ VACUUM ☐ VIBRATION ____ AXIS FOR ____ UNIT TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: INCHWORM NO. 2 COMMAND ON TEST BOX (USING FLIGHT IPS) YIELDS NO MOTION IN "DOWN" (RETRACT) DIRECTION. R.O. MOUNTED ON DUMMY A.O. PLATE, WITH .020 SHIM TO "RELAX" SPHERICAL MIRROR DIAPHRAGM

15. TEST PROCEDURE: SEE FR 0555 PARA: 16. ORIGINATOR: W. Bolinski ORG: 22-35 DATE: 2-28-82 ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

17. VERIFICATION AND FAILURE ANALYSIS: FOUND MISSING WIRE IN TEST CABLE – L3 MISSING FROM CABLE CONNECTING BREAKOUT BOX TO WEARSAVER

18. FAILED ITEM NAME AND PART NUMBER:

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE:

L3 WIRE INSTALLED AS REQUIRED. UNIT WAS IN TEST CONFIGURATION NO OVERSTRESS TO POWER SUPPLY WAS EXPERIENCED

21. AUTHENTICATION: W. Bolinski ORG: 22-35 DATE: 82-3-5 ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: L3 WIRE INSTALLED.

24. QA APPROVAL

25. QA CONCURRENCE

26. LIST ALL PARTS REPLACED

PART NUMBER	CIT SYM	PART LOT NO.	DATE CODE	MOD	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY: ORG: DATE:

28. RETESTED BY: L Evans ORG: 2-213 DATE: 3/5/82 ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

29. CAUSE AND CORRECTIVE ACTION: ~~WORKMANSHIP AND INSPECTION DISCREPANCY~~ ~~AS PERSONNEL CONCERNED HAVE BEEN ADVISED OF~~ ~~PROBLEM AND CAUTIONED TO CHECK CABLES~~ ~~OF TEST EQUIPMENT FOR PROPER INPUT AND~~ ~~OUTPUT CONNECTIONS~~ CAUSED BY ENGINEERING ERROR. ENGINEER REQUESTED A SPECIAL TEST CABLE BE

31. PAS CLOSURE: 3/8/82

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☒ TEST EQUIP. ☐ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN

DEFECT CODE:

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: W. Bolinski ORG: 22-35 DATE: 3-5-82

38. SPACECRAFT SYSTEM ENGR.: J.P. Engel ORG: 22-41 DATE: 3/8/82

39. RELIABILITY: L Evans ORG: 51 4M DATE: 3-5-82

40. CUSTOMER OR SUPPLIER: AA DATE: 3/12/82

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EL SEGUNDO, CALIFORNIA

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FAILURE REPORT

CONTINUATION SHEET

FR SERIAL NO. F0553

CONTINUATION SHEET LETTER* A

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN, DATE EACH ENTRY.

ADDITIONAL FR CONTINUATION SHEET(S) USED ☐

30 FABRICATED FOR THIS TEST. HE MARKED UP A COPY OF THE SCHEMATIC DRAWING TO SHOW LEADS REQUIRED FOR THIS TEST. HE THOUGHT THE TWO +5 V LINES, K3 AND L3 WERE REDUNDANT, THEREFORE HE DID NOT REQUEST L3 BE WIRED IN. THE ENGINEER INVOLVED IN THIS DISCREPANCY IS AWARE OF THE ERROR. HE WILL DISPLAY MORE CAUTION IN THE FUTURE.

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FAILURE REPORT

F 0555

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM | 2. CLA: | 3. MODEL: F-1 | 4. TIME OBSERVED: 17:30 | 5. DATE OBSERVED: MO 2 DA 13 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☒ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANFACTUER
7. SUBSYSTEM				
8. UNIT	RELAY OPTICS ASSY	52534	003	
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROGRESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ CHAMBER ☐ RADIATION ☐ VIBRATION ☐ TEMPERATURE ____ ° ____ AXIS FOR ____ HRS ☐ THERMAL VAC ____ ° ____ HRS. AT ____ ° ____ TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: INCHWORM NO. 2 COMMAND ON TEST BOX YIELDS LOW MV READINGS PER STEP DURING FIRST STEPS IN EITHER DIRECTION. SUBSEQUENT STEPS IN "DOWN" DIRECTION ARE SMALL, APPROX. 1 TO 2 MV.

15. TEST PROCEDURE: PARA | 16. ORIGINATOR: W. Balinski ORG 22-35 DATE 2-13-82 | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: SUBSERVIENT OPERATION IN RETRACT ("DOWN") DIRECTION NEARER TO OPTICAL ALIGNMENT POSITION YIELDS LITTLE OR NO MOVEMENT. LVDT CLAMP LOOSENING SHOWED PROBLEM TO BE INDEPENDANT OF LVDT ALIGNMENT.

19. FAILED ITEM NAME AND PART NUMBER:

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: L3 WIRE TO BE INSTALLED IN TEST CABLE. UNIT WAS IN TEST CONFIGURATION. NO OVERSTRESS TO POWER SUPPLY WAS EXPERIENCED.

21. AUTHORIZATION: W. Balinski ORG 22-35 DATE | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: L3 WIRE INSTALLED AS REQUIRED.

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY: ORG DATE | 28. RETESTED BY: ORG DATE | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: ENGINEER REQUESTED A SPECIAL TEST CABLE BE FABRICATED FOR THIS TEST. HE MARKED UP A COPY OF SCHEMATIC TO SHOW LEADS REQUIRED FOR THIS TEST. HE THOUGHT K3 AND L3 WERE REDUNDANT. BOTH ARE +5V LINES, THEREFORE HE DID NOT REQUEST L3 BE WIRED IN. THE ENGINEER INVOLVED IS AWARE OF THE DISCREPANCY AND WILL BE MORE CAUTIOUS.

31. ☐ CONTINUATION SHEET USED

33. PRB CLOSURE: 3/16/82

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION:

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☒ TEST EQUIP. ☐ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN

DEFECT CODE:

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: W. Balinski ORG 22-35 DATE 3-12-82

38. SPACECRAFT SYSTEM ENGR.: ORG 22-41 DATE 3/15/82

39. RELIABILITY: ORG 51-4 DATE 3-12-82

40. CUSTOMER OR SUPPLIER: DATE

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FAILURE REPORT

F 1669

ORIGINATOR

1. PROGRAM NAME AND NUMBER: THEMATIC MAP | 2. GLA: [illegible] | 3. MODEL: FLT | 4. TIME OBSERVED: 0900 | 5. DATE OBSERVED: MO FEB DA 3 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	RELAY OPTICS	52534	3	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROGRESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☒ SPECIAL - VACUUM PRE

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ____ AXIS FOR ____ MIN ☒ TEMPERATURE ROOM ° ____ ☐ THERMAL VAC ____ HRS. AT ____ ° ____ TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: LEFT BANK LVDT DOES NOT REVERSE
RIGHT BANK DOES NOT RESPOND

15. TEST PROCEDURE: STR FL-003 PARA 4.6.1 | 16. ORIGINATOR: L. CRISS | ORG | DATE FEB 3 | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: ELECTRICAL TROUBLE SHOOTING SHOWS OPEN WIRE IN P2 OF FLIGHT CABLE AND WIRE WAS MISSING IN WEARSAVER CABLE. UNIT WAS IN TEST CONFIGURATION. NO OVERSTRESS OF PARTS OCCURRED

19. FAILED ITEM NAME AND PART NUMBER:

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: REPAIR FLIGHT CABLE AND WEARSAVER. RETEST RELAY OPTICS, INCHWORM & LVDT

21. AUTHORIZATION: W. Balinski | ORG 22-35 | DATE 82-3-8 | ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: REPAIRED FLIGHT CABLE AND WEARSAVER. RETESTED SUCCESSFULLY.

24. QA WITNESS

25. QA RETEST

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: POOR WORKMANSHIP CAUSED OPENS. ONE DISCREPANCY WAS AN OPEN AT P2 IN CONNECTOR P2, THE OTHER WAS A MISSING WIRE IN WEAR SAVER.
ASSEMBLY TECHNICIANS AND QUALITY CONTROL PERSONNEL WERE ADVISED OF THE DISCREPANCIES AND CAUTIONED TO PREVENT THEIR RECURRENCE.

31. ☐ CONTINUATION SHEET USED

33. FRB CLOSURE: [signature] 3/10/82

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP ☐ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/LAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: W. Balinski | ORG 22-35 | DATE 82-3-8

38. SPACECRAFT SYSTEM ENGR: [signature] | ORG 22-41 | DATE 3/9/82

39. RELIABILITY: [signature] | ORG 151-41 | DATE 2-8-82

40. CUSTOMER SUPPLIER: [signature] | DATE 4/

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EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
T.M. PL1162	V011	F1		MO 9 DA 29 YR 80

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☒ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	INVPS	53757	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER	XMFR	52041		

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMP °/° ☐ THERMAL VAC HRS AT °/° AXIS FOR MIN TYPE ☐ OTHER

14. DESCRIPTION OF FAILURE: TRANSFORMER (T1) MEASURES OPEN AT SECONDARY CIRCUIT.

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION
16796	4.1	J. Kark	22-35	10-3-80	☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: TRANSFORMER WAS FOUND TO BE DEFECTIVE PRIOR TO APPLICATION OF POWER.

19. FAILED ITEM NAME AND PART NUMBER: 52041 (T1)

20. ☒ FOLLOWING REWORK/RETEST REQUIRED: REPLACE T1 (52041 S/N 202) & RETEST PER 16796. NOTE: TRANSFORMER P/N 52041 WAS REMOVED & REPLACED ON PRINTED WIRING BOARD P/N 52041.
☐ REWORK/RETEST NOT REQUIRED BECAUSE

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION
	22-35	10-21-80	☐ SHEET USED

MANUFACTURING AND TEST

22. REWORK/RETEST ACTION TAKEN: TRANSFORMER REPLACED & [redacted] RETESTED. SEE ATTACHED DATA.

24. FOR REWORK: 10%

25. FOR RETEST: 1 1 1%

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
50940	T1					

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION
						☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: UNKNOWN. PART LOST BY RELIABILITY. CONTROL OF REMOVED PARTS HAS BEEN CHANGED. PARTS ARE NOW SENT TO MRB ON A NON CONFORMING MATERIAL REPORT AND DISPOSITIONED AS NECESSARY. PARTS REQUIRING FAILURE ANALYSIS WILL BE SENT TO THE PARTS BOARD ON A 778 FORM (REJ) AND A SHIPPER. PARTS CONTROL TO MAINTAIN.

31. FRB CLOSURE: 2/2/82

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

33. CONTINUATION ☐ SHEET USED

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☒ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☒ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
	22-35	1-31-82	for J. Engel	SBRC	2/2/82

39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
	51-41	2-2-82		

011873 SC JAN 80

SECTION 2.12
ELECTRONICS MODULE

Section 2.12.2

Electronics Module

Performance Data

The acceptance performance (test) data for the Electronic Module is contained in Appendix E of this report (Vol. IV, part E).

2.12.2
Acceptance Data

2.12.2.1
Configuration Lists

AS-BUILT CONFIGURATION LIST

ELECTRONICS MODULE ASSY REV 2
52347 S/N 201

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
2	52347	ELECTRONICS MODULE	D 4588A	B 4293A 4242A 4091A 4113A	B 4293A 4242A 4091A 4113A	201
3	3533003-100	MULTIPLEXER ASSY	C R43009 43074 65661 65662 W124 W125	C 43074 65661 65662 W124 W125	C 43009 43074 65661 65662 W124 W125	003
3	50869	POWER, SUPPLY ASSY	D 2015A 2039A D030 D068 W074 W092 W093 W101	D 2015A 2039A D030 D068 W074 W092 W093 W101	D 2015A 2039A D030 D068 W074 W092 W093 W101	004
3	50900	PWB ASSY, SERIAL MAGNITUDE COMMAND	C 3716A D046 W060R1 W097	C 3716A D046 W060R1 W097	C 3716A D046 W060R1 W097	002

ID	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
	50904-1	PWB ASSY, POSTAMP BAND #1	G	G	G	101
			4072A	4072A	4072A	
	NOTE: Configuration will conform to "As Built" pending incorporation of EO 3142A		D045	D045	D045	
			D090	D090	D090	
			D105	D105	D105	
			W017	W017	W017	
			W060R1	W060R1	W060R1	
			W097	W097	W097	
			W167	W167	W167	
	50904-2	PWB ASSY, POSTAMP BAND #2	G	G	G	201
			4072A	4072A	4072A	
	NOTE: Configuration will conform to "As Built" pending incorporation of EO 3142A		D045	D045	D045	
			D090	D090	D090	
			D105	D105	D105	
			W017	W017	W017	
			W060R1	W060R1	W060R1	
			W097	W097	W097	
	50904-3	PWB ASSY, POSTAMP BAND #3	G	G	G	201
			4072A	4072A	4072A	
	NOTE: Configuration will conform to "As Built" pending incorporation of EO 3142A		D045	D045	D045	
			D090	D090	D090	
			D105	D105	D105	
			D135	D135	D135	
			W017	W017	W017	
			W060R1	W060R1	W060R1	
			W097	W097	W097	
	50904-4	PWB ASSY, POSTAMP BAND #4	G	G	G	201
			4072A	4072A	4072A	
	NOTE: Configuration will conform to "As Built" pending incorporation of EO 3142A		D045	D045	D045	
			D090	D090	D090	
			D105	D105	D105	
			W017	W017	W017	
			W060R1	W060R1	W060R1	
			W097	W097	W097	
			W120	W120	W120	

ID/L	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
	50908-1	PWB ASSY, POSTAMP BAND #5	D	D	D	201
			3567A	3567A	3567A	
			D090	D090	D090	
			W018	W018	W018	
			W060R1	W060R1	W060R1	
			W097	W097	W097	
	50908-2	PWB ASSY, POSTAMP BAND #7	D	D	D	201
			3567A	3567A	3567A	
			D090	D090	D090	
			W018	W018	W018	
			W060R1	W060R1	W060R1	
			W097	W097	W097	
1	50912	PWB ASSY, POSTAMP BAND #6	E	E	E	201
			D091	D091	D091	
			D094	D094	D094	
			D136	D136	D136	
			W060R1	W060R1	W060R1	
			W097	W097	W097	
3	50916	PWB ASSY CALIB. SHUTTER MAIN	F	F	F	201
			D080	D080	D080	
			D104R1	D104R1	D104R1	
			D109R1	D109R1	D109R1	
			D111	D111	D111	
			D116	D116	D116	
			D117	D117	D117	
			W035	W035	W035	
			W060R1	W060R1	W060R1	
			W097	W097	W097	

ID NO.	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
3	50920	PWB ASSY, TEMP CONTROL	D	C	C	101
			3717A	3457A	3457A	
			4290A	4290A	4290A	
			D054	D054	D054	
			D077	D077	D077	
			D093	D093	D093	
			D101	D101	D101	
			D116	D116	D116	
			W012	W012	W012	
			W060R1	W060R1	W060R1	
			W097	W097	W097	
3	50926	PWB ASSY, CALIB LAMP AND INCHWORM DRIVERS	E	E	E	201
			D044	D044	D044	
			D088R1	D088R1	D088R1	
			D115	D115	D115	
			SB-W031	SB-W031	SB-W031	
			W060R1	W060R1	W060R1	
			W097	W097	W097	
	50942	TEMPERATURE CONTROL	G	F	F	202
			4343A	3740A	3740A	
			4565A	3763A	3763A	
			D150	3809A	3809A	
				3819A	3819A	
				4343A	4343A	
				4565A	4565A	
				D150	D150	
	50948	PWB ASSY, VERIFICATION REGISTER	E	E	E	201
			3218A	3218A	3218A	
			3718A	3718A	3718A	
			3836A	3836A	3836A	
			D079	D079	D079	
			D114	D114	D114	
			D131	D131	D131	
			W022	W022	W022	
			W060R1	W060R1	W060R1	
			W097	W097	W097	

PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
51398	CALIB. SHUTTER BACKUP	E	E	E	101
		4031A	4031A	4031A	
		4452A	4452A	4452A	
		D056	D056	D056	
		D108R1	D108R1	D108R1	
		D116	D116	D116	
		D133	D133	D133	
		D137	D137	D137	
		D147	D147	D147	
		D153	D153	D153	
		SB-W033	SB-W033	SB-W033	
		W060R1	W060R1	W060R1	
		W097	W097	W097	
51402	PWB ASSY, TELEMETRY SCALING FUSELINK	D	D	D	201
		3685A	3685A	3685A	
		3691A	3691A	3691A	
		3710A	3710A	3710A	
		4288A	4288A	4288A	
		D058R1	D058R1	D058R1	
		D072	D072	D072	
		D112	D112	D112	
		D116	D116	D116	
		D125	D125	D125	
		W013	W013	W013	
		W027	W027	W027	
		W060R1	W060R1	W060R1	
		W097	W097	W097	
51795	PWB ASSY MACRO DISCRETE	F	F	F	102 & 202
		3720A	3720A	3720A	
		3835A	3835A	3835A	
		D065	D065	D065	
		D113R1	D113R1	D113R1	
		D130	D130	D130	
		W060R1	W060R1	W060R1	
		W097	W097	W097	

NO VI.	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
I	51813	MACRO DISCRETE	C	C	C	201
			3705A	3705A	3705A	
			D078	D078	D078	
			W060R1	W060R1	W060R1	
			W097	W097	W097	
I	52250-1	PWB ASSY, SCAN LINE CORRECTOR	C	C	C	
			1080A	1080A	1080A	
			1638A	1638A	1638A	
			2671A	2671A	2671A	
			3272A	3272A	3272A	
			3712A	3712A	3712A	
			W011	W011	W011	
			D116	D116	D116	
			W060R1	W060R1	W060R1	
			W097	W097	W097	
I	52250-2	PWB ASSY, SCAN LINE CORRECTOR	C	C	C	
			1080A	1080A	1080A	
			1638A	1638A	1638A	
			2671A	2671A	2671A	
			3272A	3272A	3272A	
			3712A	3712A	3712A	
			W011	W011	W011	
			D116	D116	D116	
			W060R1	W060R1	W060R1	
			W097	W097	W097	
I	52348	CABLE RTG ASSY	F	F	F	005
			3844A	3844A	3844A	

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
3	52360	COVER, TOP	B	B	B	
			1620A	1620A	1620A	
			1854A	1854A	1854A	
			1877A	1877A	1877A	
3	52362	COVER, BOTTOM	B	B	B	
			1855A	1855A	1855A	
			1884A	1884A	1884A	
3	52363	COVER, BOTTOM FRONT	B	B	B	
			1621A	1621A	1621A	
			1856A	1856A	1856A	
			1878A	1878A	1878A	
3	52797	PWB ASSY AUX CIRCUIT BOARD	C	C	C	201
			3711A	3711A	3711A	
			W014	W014	W014	
			W060R1	W060R1	W060R1	
			W097	W097	W097	
3	53393	COVER FRONT	A	A	A	
			1879A	1879A	1879A	
3	53877	PWB ASSY, MOTOR DRIVER COOLER DOOR	B	B	B	101
			3706A	3706A	3706A	
			D037	D037	D037	
			D098	D098	D098	
			D100	D100	D100	
			D116	D116	D116	
			W019	W019	W019	
			W060R1	W060R1	W060R1	
			W097	W097	W097	
			4456A	4456A	4456A	

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
3	16268	PROCESS SPEC, SURFACE MTD COMPONENTS	A	A	A	
			2216A	2216A	2216A	
			2940A	2940A	2940A	
			3080A	3080A	3080A	
			3283A	3283A	3283A	
3	16704	ACCEPTANCE TEST, PROCEDURE FOR ELECTRONICS MODULES	C	C	C	
			3987A	3987A	3987A	
			4059A	4059A	4059A	
			4089A	4089A	4089A	
			4159A	4159A	4159A	
			4180A	4180A	4180A	

R. A. Groves, CDMO

3-25-82
W. D. Adams, Quality

Listing of Liens

ELECTRONIC MODULE

P/N 52347

FLIGHT

Failure Reports Number

Open	Closed	Closed
S8021	F0606	S8315
	F0622	S8316
	F1666	S8320
	F1667	S8321
	F1668	S8325
	F1761	S8326
	F1769	S8327
	F1774	S8329
	F1776	S8343
	F1781	S8363
	F1783	S8364
	F2722	S8365
	F2723	S8367
	F2724	S8368
	S8049	S8372
	S8050	S8384
	S8051	S8390
	S8107	S8407
	S8108	S8446
	S8109	S8447
	S8110	S8456
	S8112	S8460
	S8125	S8464
	S8126	
	S8133	
	S8139	
	S8180	
	S8283	
	S8309	
	S8310	
	S8311	
	S8312	
	S8313	
	S8314	

Deviations	Waivers
D-125	
D-129	
D-130	
D-131	
D-133	
D-135	
D-136	
D-137	
D-147	
D-150	
D-159	

ELECTRONIC MODULE

P/N 52347

FLIGHT		PROTOFLIGHT		ENGINEER	
Failure Report No.		Failure Report No.		Failure Report No.	
Open	Closed	Open	Closed	Open	Closed
S8021	F0606		F0551		F0501
	F0622		F0582		F0509
	F1666		F0584		F0515
	F1667		F0590		F0516
	F1668		F0601		F0534
	F1761		F0621		F0539
	F1769		F1703		F0542
	F1774		F1709		F0548
	F1776		F1712		?F0549
	F1781		F1713		F0563
	F1783		F1715		F0564
	F2722		F1719		F0593
	F2723		F1773		F1720
	F2724		F1777		F2646
			F1778		F2692
	S8049		F1779		F2743
	S8050		F1789		F2744
	S8051		F1796		F2750
	S8107		F1797		F2752
	S8108		F2362		F2754
	S8109		F2363		F2756
	S8110		F2391		F2797
	S8112		F2393		
	S8125		F2394		
	S8126		F2633		
	S8133		F2634		
	S8139		F2638		
	S8180		F2640		
	S8283		F2671		
	S8309		F2686		
	S8310		F2693		
	S8311		F2694		
	S8312		F2695		
	S8313		F2698		
	S8314		F2699		
	S8315		F2700		
	S8316		F2701		
	S8320		F2702		
	S8321		F2703		
	S8325		F2705		
	S8326		F2706		
	S8327		F2707		
	S8329		F2708		
	S8343		F2720		
	S8363		F2738		
	S8364		F2741		
	S8365		F2758		
	S8367		F2759		
	S8368		F2760		
	S8384		F5175		
	S8390		F5183		
	S8407		F5189		
	S8446		S8012		
	S8447		S8024		
	S8456		S8044		
	S8460		S8045		
	S8464		S8047		
			S8069		
			S8073		
			S8074		
			S8466		

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO.

1. ORIGINATOR NAME AND ADDRESS
Santa Barbara Research Center (Hughes Aircraft Co.)
75 Coromar Drive, Goleta, CA 93117

2. [X] DEVIATION [ ] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVED NO.
PF & F1	11323	TM	D125

5. BASE LINE AFFECTED: [ ] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	NOR. NO.
11323	51402	D	FO 35704

9. TITLE OF DEVIATION/WAIVER
LAMP SEQUENCER PWB ALTERNATE WIRING

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Electronic Module Assembly

CLASSIFICATION OF EFFECT

12. CD NO. II

13. DEFECT NO.

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED
PWB TLMY Scaling, Fuse-link, Lamp Seq.

16. PART NO. OR TYPE DESIG.
51402-D

17. LOT NO. 002/003

18. QTY 2

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE

21. EFFECT ON DELIVERY SCHEDULE
5 Month Schedule Impact if disapproved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.

23. DESCRIPTION OF DEVIATION/WAIVER
Request authorization to add Resistor and alternate wiring (jumpers) to accommodate circuit design changes.

24. NEED FOR DEVIATION/WAIVER
Redesign and reprocurement of electronic circuit boards would be required in order to eliminate alternate wiring and addition of resistor. Minimum 5 months' schedule slip and considerable cost would be involved. Redesign is not considered cost effective at this time.

RE [signature]
QA [signature]
REA L. Evans [signature] SYS ENGR [signature] BE [signature]
CMO [signature]

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
51065 S/N 002 & SUBSO

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE — TITLE
Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [ ] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY
NASA GSFC

SIGNATURE [signature] DATE 9/1/81

DD FORM 1694

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED
11/05/81

PROCURING ACT VITY NO.

1. ORIGINATOR NAME AND ADDRESS
Santa Barbara Research Center
75 Coromar Dr. Goleta, CA 93117

2. [X] DEVIATION [ ] WAIVER
3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
Flight	11323	TM	D-129

5. BASE LINE AFFECTED: [ ] FUNCTIONAL [ ] ALLOCATED [X] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. CDR		52934-A	
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	WEB NO.

9. TITLE OF DEVIATION/WAIVER
Use of alternate terminal assembly.

10. CONTRACT NO.
NAS5-24200

11. IDENTIFICATION ITEM NOMENCLATURE
Board Capacitor and Relay Assy.

12. CD NO.

13. EFFECT NO.

14. EFFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRIT CAL

15. NAME OF PART OR HIGHEST ASSEMBLY AFFECTED
Terminal STUD, Insulated

16. PART NO. OR TYPE DESIG.
E25-E29

17. LOT NO.

18. QTY
5

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
None

52934-A

21. EFFECT ON DELIVERY SCHEDULE
5 month schedule slip if dev. not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER
Request usage of Qty. 5 53413 bond on type terminals in place of Qty. 5 54310 terminals for designated E25 to E29 on EO 2853A of 52934-A assembly.

24. NEED FOR DEVIATION/WAIVER

54310 terminals are unavailable in SBRC or HAC stores. Outside procurement estimated at 3 months. Thematic Mapper schedule slip of 3 months will result if alternate terminal usage is not approved.

Note: P/N 53413 is not on the TM Approved Parts and Materials List, however they are on the MSS Approved Parts and Materials List.

REA J A Banach SYS ENGR J L Engel

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
51065 SN 002 ONLY

26. NAME AND AUTHORIZED SIGNATURE
J L Engel 81 11 05

27. TITLE
Minor - System Engineer
Major/Critical - Program Manager

28. APPROVAL/DISAPPROVAL

[ ] APPROVAL RECOMMENDED [X] APPROVED [ ] DISAPPROVED

29. GOVERNMENT ACTIVITY
NASA GSFC

SIGNATURE
F E Ehl

DATE
11/11

DD FORM 1694 (for the previous printing, use the PAPS)

ORIGINAL PAGE IS
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Program Construction 310

REQUEST FOR DEVIATION/WAIVER
SEE MIL-STD-480 OR MIL FOR INSTRUCTIONS

DATE PREPARED
11/05/81

PROCURING ACTIVITY NO

1. ORIGINATOR NAME AND ADDRESS
Santa Barbara Research Center
75 Coromar Dr. Goleta. CA 93117

2. [X] DEVIATION [ ] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

4a. MODEL TYPE	4b. WBS CODE	4c. SYS. DESIG.	4d. DEVIATION NO.
Plt.	11323	TM	D-130

5. BASE LINE AFFECTED: [ ] FUNCTIONAL [ ] ALLOCATED [X] PRODUCT

6. OTHER SYSTEM/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED/TEST PLAN

	WBS CODE	SPEC. DOC. NO.	REV.
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

WBS CODE	NUMBER	REV.	MOD NO.
11323	51795	E	EO 3835A

9. TITLE OF DEVIATION/WAIVER
Alternate component placement (non contact to board)

10. CONTRACT NO. & LINE NO.
NAS5-24200

11. IDENTIFICATION OF ITEM AFFECTED
Thematic Mapper Assy.

12. CI NO.

13. EFFECT ON CI CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

14. NAME OF PART OR COMPONENT AFFECTED | 15. PART NO. OR TYPE DESIG. | 16. LOT NO. | 17. S/N
Printed wiring board assy. Macro discrete:Com. #1 | 51795-E

18. RECURRING DEVIATION/WAIVER: [X] YES [ ] NO

19. EFFECT ON COST/WORK

20. EFFECT ON DELIVERY SCHEDULE

21. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

22. DESCRIPTION OF DEVIATION/WAIVER

Need to be able to mount components off the board surface as shown on drawing. Support bonding shall be used to secure part. Does not meet requirements of Para. 3A503 of Spec NHB 5300.4 (3A).

23A. NEED FOR DEVIATION/WAIVER

Circuit changes required from RCR05 to RNN55 resistors after the circuit boards were procured. As a result, pad spacing is too close in some cases to mount the component on the board surface and still meet lead minimum bend radius.

REA J A Conrad SYS ENGR J L Cooper QA M Wilson 11/10/81 PE David H Newman 11/5/81

23. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
5106S SN 003 ONLY

CMC [X]

24. NAME OF ORIGINATOR'S IMMEDIATE SUPERVISOR
J L Cooper 11/05

25. Minor - System Engineering
Major/Critical - Program Manager

26. APPROVAL/DISAPPROVAL

[ ] APPROVAL RECOMMENDED [X] APPROVED [ ] DISAPPROVED

SIGNATURE DATE

DD FORM 1694

ORIGINAL PAGE IS
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Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR -481 FOR INSTRUCTIONS)

DATE PREPARED
11/05/81

PROCURING ACTIVITY NO.

1. ORIGINATOR NAME AND ADDRESS
Santa Barbara Research Center
75 Coromar Dr. Goleta, CA 93117

2. [X] DEVIATION [ ] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DRAWING NO.
Flt.	11323	TM	D-131

5. BASE LINE AFFECTED: [ ] FUNCTIONAL [ ] ALLOCATED [X] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED/TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. TEN			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	MOD. NO.
11323	50948	E	EO 3656A

9. TITLE OF DEVIATION/WAIVER
Alternate component placement (no contact with board).

9. CONTRACT NO. & LINE ITEM
NAS5-24200

11. IDENTIFICATION OF ITEM/CONFIGURATION
Thematic Mapper Assy.
printed wiring board assy:
verification resistor 50948-E

12. CD NO. | 13. DEFECT NO. | 14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

17. LOT NO. | 18. QTY

19. RECURRING DEVIATION/WAIVER: [ ] YES [ ] NO

20. EFFECT ON COST/PRICE

21. EFFECT ON DELIVERY SCHEDULE

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.

23. DESCRIPTION OF DEVIATION/WAIVER

Need to be able to mount components off the board surface as shown on drawing. Support bonding shall be used to secure part. Does not meet requirements fo Para. 3A503 of Spec NHB 5300.4 (3A).

24. NEED FOR DEVIATION/WAIVER

Circuit changes required changes from RCR05 to RNN55 resistors after the circuit boards were procured. As a result, pad spacing is too close in some cases to mount the component on the board surface and still meet lead minimum bend radius.

REA C A Conach SYS ENGR J L Conrad QA 11/5/81 PE 11/5/81

25. PRODUCT OR EFFECTIVITY BY SERIAL NUMBER
51065 SN 003 ONLY

CMO

26. SIGNATURE & DATE OF ORIGINATOR
J L Conrad 81111 05

Minor - System Engineer
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

[V] APPROVAL RECOMMENDED [ ] APPROVED [ ] DISAPPROVED

28. GOVERNMENT ACTION

29. SIGNATURE DATE

DD FORM 1694

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 4 JANUARY 1982

PROCURING ACTIVITY NO.:

1. ORIGINATOR NAME AND ADDRESS
SANTA BARBARA RESEARCH CENTER
75 COROMAR DR. GOLETA, CA. 93117

2. [X] DEVIATION [ ] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F1	11323	TM	D-133

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	ADD. NO.
11323	51398	E	

9. TITLE OF DEVIATION/WAIVER
Alternate Wiring

10. CONTRACT NO. & LINE ITEM
NAS 5-24200 #32

11. CONFIGURATION ITEM NOMENCLATURE
Electronics Module Assembly

CLASSIFICATION OF DEFECT

12. CD NO.: II

13. DEFECT NO.:

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF NEXT CD LOWEST ASSEMBLY AFFECTED: Cal Shutter Back (A7)

16. NEXT CD. OR TYPE DESIG.: 51398-E

17. LOT NO.:

18. QTY: 1

19. REQUIRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE:

21. EFFECT ON DELIVERY SCHEDULE
5 months schedule impact if disapproved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.:

23. DESCRIPTION OF DEVIATION/WAIVER

Alternate wiring (trace cuts, jumper wires and added parts) incorporated on assembly drawing to accommodate circuit design changes. Sec. 51398 assembly drawing and referenced SP80165 alternate wiring process specification attached.
SEE EOs: EO 2992A
3072A
Ref: W033 per EO 8703
D056 per EO 1084A
D108R1

24. NEED FOR DEVIATION/WAIVER
Redesign and re-procurement of electronic circuit boards would be required in order to eliminate alternate wiring. Minimum 5 months schedule slip and considerable costs would be involved. Redesign is not considered cost effective at this time.

RE 1/4/82
QA 1/6/82
REA G.A.Bench SYS ENGR L.L.Engel PE 1/7/82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
51065 SN 003 only

26. SIGNATURE OF APPROVING AUTHORITY: L.L.Engel 12 Jan 82
TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC

SIGNATURE: Eleanor B Kitt DATE: 1/28/82

DD FORM SEC 66 1694

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER (SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 8 January 82

PROCURING ACTIVITY NO.: H-P

1. ORIGINATOR NAME AND ADDRESS
SANTA BARBARA RESEARCH CENTER (HUGHES AIRCRAFT)
75 Coromar Drive, Goleta, CA 93117

2. [X] DEVIATION [ ] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F	11323	TM	D-135

5. BASE LINE AFFECTED: [ ] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [ ] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	ADD. NO.
11323	50904	C	

9. TITLE OF DEVIATION/WAIVER
Alternate Wiring

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Electronics Module Assembly

CLASSIFICATION OF DEFECT

12. CD NO.: II

13. DEFECT NO.:

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: PWB Assy Post Amp Bands 1-4

16. PART NO. OR TYPE DESIG.: 50904-3

17. LOT NO.:

18. QTY: -1-

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE

21. EFFECT ON DELIVERY SCHEDULE
5 Month Schedule Impact if disapproved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.

23. DESCRIPTION OF DEVIATION/WAIVER

Alternate wiring (added wires) to PWB assembly. Adding jumpers between R70B-U4P33, R73B-U7P56, R79A-U12P47 per SP80165, Procedure B, using item 32 of 50904.

Ref: NCMR 412474

24. NEED FOR DEVIATION/WAIVER

Redesign and reprocurement of electronic circuit boards would be required in order to eliminate alternate wiring. Minimum 5 months schedule slip and considerable cost would be involved. Redesign is not considered cost effective at this time.

RE [signature] 1/8/82

QA [signature]

REA [signature] SYS ENGR [signature] PE [signature]

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: [signature]
TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVED

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA

SIGNATURE: [signature] DATE: 1/9/82

DD FORM 1694

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MATERIAL REVIEW CONTROL ORDER

MRCO 4 1 2 4 7 4 R

W / A V 0 1 2

PART NO. 50904-3 REVISION F

PART NAME POST AMP PWB BAND 3

QUANTITY 1 S/N 204

ROUTE TO: _____ P.O. MASTER CLEARED 1 of 5

	OPR NO.	INSTRUCTIONS	DATE	QTY ACC	QTY SUS	INSP OPER	COMMENTS
22-74	100	1) INSTALL 30 AWG TYP EM (J-W-1177) WIRE FROM R79 (A SIDE) PAD TO U12 PAD AT PIN 47 PER SP 50165, REV ___					
		2) INSTALL 30 AWG TYPE M (J-W-1177) WIRE FROM R73 (B SIDE) PAD TO U7 PAD AT PIN 52 PER SP 50165 REV ___					
		5) INSTALL 30 AWG TYPE M (J-W-1177) WIRE FROM R70 (B SIDE) PAD TO U4 PAD AT PIN 33 PER SP 50165 REV ___					
LAST OPR		RETURN THIS CARD TO MATERIAL REVIEW FOR RECORD CLEARANCE.					

SB 0344-B-1 FEB 78

QA APPROVAL _____ DATE _____

ENG APPROVAL _____ DATE _____

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MATERIAL REVIEW CONTROL ORDER MRCO

4	1	2	4	7	4	R
W / A	V	0	1	2		

CONTINUATION SHEET
PAGE 2 OF 2

	OPR NO.	INSTRUCTIONS	DATE	QTY ACC	QTY SUS	INSP OPER	COMMENTS
Rev. Dwg.							
		4) WHEN PERFORMING ST-AS 1, 2 & 3 REFERENCE WORKSHEET ATTACHED TO MRCO					
ST-AS	200	INSPECT PART# 100 Per SP 80165 & WORKSHEET.					
AF	300	MCT					
	400	Return to MRB					
LAST CPR		RETURN THIS CARD TO MATERIAL REVIEW FOR RECORD CLEARANCE.					

SB 0344-B-1 FEB 78

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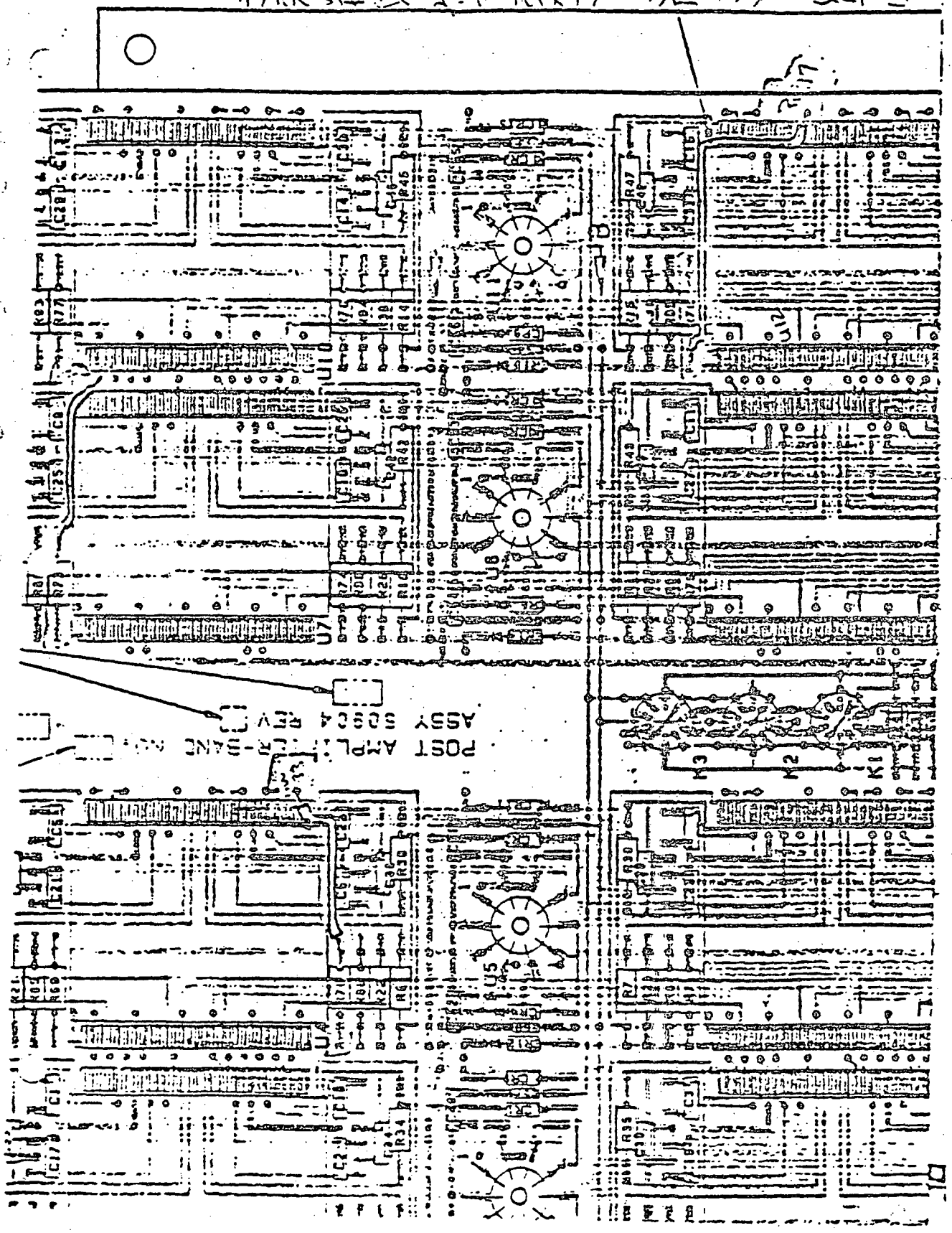


Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 13 January, 1982

PROCURING ACTIVITY NO.: 4852

1. ORIGINATOR NAME AND ADDRESS
SANTA BARBARA RESEARCH CENTER
75 Coromar Drive, Goleta, CA 93117

2. [X] DEVIATION [ ] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F1	11323	TM	D136

5. BASE LINE AFFECTED: [ ] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [ ] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	MOD. NO.
11323	50912	E	

9. TITLE OF DEVIATION/WAIVER
Band-6, Voltage Regulator, Series Resistor Change

10. CONTRACT NO. & LINE ITEM
NAS5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF DEFECT

12. CD NO.: II
13. DEFECT NO.:
14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: PWB ASSY Postamp-6
16. PART NO. CD TYPE DESIG.: 50912-E
17. LOT NO.: F1
18. QTY: 1
19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE

21. EFFECT ON DELIVERY SCHEDULE

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.

23. DESCRIPTION OF DEVIATION/WAIVER
Alternate wiring, replaced components, and added components per EO3456A required using SP80165. This Engineering Order provides the voltage regulator with current capability to prevent power foldback at Band 6 turn on. Possible component stress as well as initial circuit performance degradation is corrected by the modification.

24. NEED FOR DEVIATION/WAIVER
The Band-6 voltage regulator goes into current limit due to turn-on characteristic of circuit. This characteristic is unacceptable. Redesign and reprocurement of electronic circuit boards would be required to eliminate cuts and alternate wiring. Minimum 5 months schedule slip and considerable cost would be involved.

RE [signature] 1/13/82
QA [signature] 1-13-82
REA [signature] SYS ENGR [signature] PE [signature] 1-13-82
MC [signature] 1-14-82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
51065 SN 003 only

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE [signature]
TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED
b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC
SIGNATURE: George B. Scott
DATE: 1/13/82

DD FORM 1694

SBRC ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. PL1162A

CODE IDENT 11373 SHEET 1 OF 3

ENG TITLE PRINTED WIRING BOARD ASSY AMPLIFIER & COMMAND RELAYS (A16)			DRAWING NUMBER 50912 (2)
PROJECT NUMBER PL1162	ITEM DISPOSITION REWORK ☒ ITEMS CONFORM ☐ NO ITEMS MADE ☐ REJECT ☐ USE ☐ NOT APPLICABLE ☐	CLASS CHANGE I ☐ II ☒A	DRAWING TYPE A ☐ B ☒
EFFECTIVITY SICC5 THRU COL & SUBS		AUTHORIZING ECR NUMBER TM24821C1	

DESCRIPTION OF CHANGE
-13 EO CANCELS AND SUPERSEDES EO's 3291A & 3414A

1. IN LM, CHANGED PN, ITEM 16
   IS: 908611-204 RESISTOR, 13, 1%, 2W
   WAS: 908665-23 RESISTOR, 21, 5%, 1/8 W

2. IN LM, ADDED ITEMS ☆1 THRU ☆6

2 REQD	908816-1 82577	TRANSISTOR, PWR, NPN (2N3752)	☆1
1	908678-135	RESISTOR, 2.49, 1%, 1W	☆2
1	908678-126	RESISTOR, 2.00, 1%, 1W	☆3
2	908555-186 82577	CAPACITOR, 10NF, 10%, 50V	☆4
8	SC80191-8-2	PAD PATTERN	☆5
2	NAS1291C3	NUT, SELF-LKG, .190-32 (NAS1291)	☆6
2 REQD	NAS620C10	WASHER FLAT, No. 10 (NAS620)	☆7
AR	J-W-1177/14	WIRE, INSUL; AWG 26, J-W-1177, TYPE M	☆8

3. IN GENERAL NOTES, ADDED:
   ☆8 INSTALL COMPONENTS, PAD PATTERNS AND WIRE PER SP80165, PROCEDURE C.

4. IN COMPONENT IDENT TABLE, ADDED

Q1, 2	ITEM ☆1
R29	ITEM ☆2
R30	ITEM ☆3
C23, 24	ITEM ☆4

☆ NOTE AND/OR ITEM NUMBER TO BE ASSIGNED AT TIME OF INCORPORATION

CHECKED BY	DATE	QUALITY APPROVAL	DATE 7-20-71	RELEASED BY	DATE
RECKED BY	DATE	MANUFACTURING APPROVAL	DATE	INCORPORATED BY	DATE
SEA/ESA APPROVAL	DATE	PROJECT APPROVAL	DATE 7/20/71	DRAWING REV LETTER	

GENERAL DYNAMICS CODE IDENT 11323

ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. 8+5[illegible]

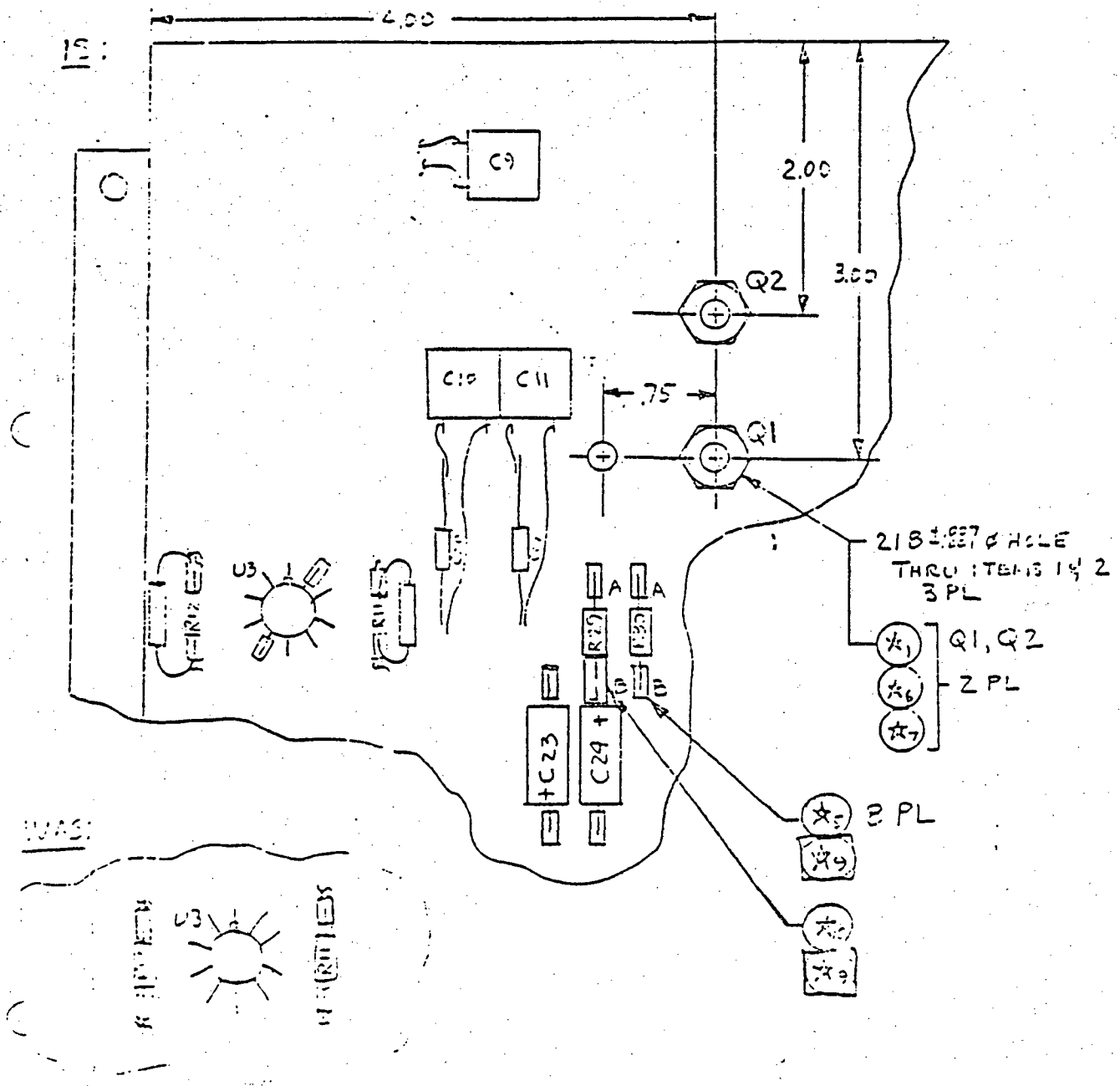
SHEET 2

DRAWING TITLE PRINTED WIRING BOARD ASSY
AMPLIFIER & COMMAND RELAYS (A16)

DRAWING NUMBER 50912 (2)

DESCRIPTION OF CHANGE

5. ON F/D, SH 3, ZONE 3D
ADDED Q1-2, R29-30, C 23-24 & PAD PATTERNS;
RELOCATED R11-12.



SBRC ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. PL1162A

CODE IDENT 11373 SHEET 1 OF 3

ING TITLE PRINTED WIRING ISOLATED ASSY AMPLIFIER & COMMAND RELAYS (A16)			DRAWING NUMBER 50912 (2)
PROJECT NUMBER PL1162	ITEM DISPOSITION: REWORK ☒ ITEMS CONFORM ☐; NO ITEMS MADE ☐ REJECT ☐; USE ☐ NOT APPLICABLE ☐	CLASS CHANGE I ☐ II ☒ A	DRAWING TYPE A ☐ B ☐
FFECTIVITY S1005 THRU 0012 & SUBS		AUTHORIZING ECR NUMBER TM 40861	

ESCRIPTION OF CHANGE
THIS EO CANCELS AND SUPERSEDES EO's 32911 & 32914A

1. IN LM, CHANGED PN, ITEM 18
   IS: 90611-204 RESISTOR, 13, 1%, 2W
   WAS: 908665-23 RESISTOR, 22, 5%, 1/8W

2. IN LM, ADDED ITEMS ☆1 THRU ☆8

2 REQD	908614-1	82577	TRANSISTOR, PWR, NPN (2N3752) ☆1
2	90867E-135		RESISTOR, 2.49, 1%, 1W ☆2
2	90867E-126		RESISTOR, 2.00, 1%, 1W ☆3
2	908555-186	82577	CAPACITOR, 10NF, 10%, 50V ☆4
8	SC80181-8-2		PAD PATTERN ☆5
2	NAS1291C3		NUT, SELF-LKG, 190-32 (NAS1291) ☆6
2 REQD	NAS620C10		WASHER FLAT, No. 10 (NAS620) ☆7
AR	J-W-1177/14		WIRE, INSUL; AWG 26, J-W-1177, TYPE M ☆8

3. IN GENERAL NOTES, ADDED:
   ☆9 INSTALL COMPONENTS, PAD PATTERNS AND WIRE PER SP80165, PROCEDURE C.

4. IN COMPONENT IDENT TABLE, ADDED

Q1, 2	ITEM ☆1
R29	ITEM ☆2
R30	ITEM ☆3
C23, 24	ITEM ☆4

☆ NOTE AND/OR ITEM NUMBER TO BE ASSIGNED AT TIME OF INCORPORATION

AFED BY	DATE	QUALITY APPROVAL	DATE	RELEASED BY	
ECKED BY	DATE	MANUFACTURING APPROVAL	DATE	INCORPORATED BY	DATE
EA/ESA APPROVAL	DATE	PROJECT APPROVAL	DATE 7-20-81	DRAWING REV LETTER	

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Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 14 January 1982

PROCURING ACTIVITY NO.

1. ORIGINATOR NAME AND ADDRESS
Santa Barbara Research Center
75 Coromar Dr., Goleta, Ca 93117

2. [X] DEVIATION [ ] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F1	11323	TM	D137

5. BASE LINE AFFECTED: [ ] FUNCTIONAL [ ] ALLOCATED [X] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [ ] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	MOD. NO.
11323	51398	E	

9. TITLE OF DEVIATION/WAIVER
Cal Shutter Backup, Timing Jitter Correction

10. CONTRACT NO. & LINE ITEM

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF DEFECT

12. CD NO. II | 13. DEFECT NO. | 14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF NEXT OR LOWEST ASSEMBLY AFFECTED: PWB Cal Shutter Backup

16. PART NO. OR TYPE DESIG.: 51398 E

17. LOT NO.: F1

18. QTY: 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE

21. EFFECT ON DELIVERY SCHEDULE

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.

23. DESCRIPTION OF DEVIATION/WAIVER

Alternate wiring and added component required per SP80165.
See EO 4031A.
This action will insure that Timing Jitter in the Phase Control Loop of the Redundant Shutter does not occur.

24. NEED FOR DEVIATION/WAIVER

It has been observed that under special conditions which are possible during operation that Redundant Shutter timing signals can move out of tolerance. E.O. 4031A corrects this problem completely. Redesign and reprocurement of 51398 PWB would be required to eliminate alternate wiring. Minimum 5 month schedule slip and considerable cost would be involved.

REA J A Banach 1/14/82 SYS ENGR [signature] 1/14/82 PE [signature]
QA S H Evans 1-14-82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: [signature]

TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC

SIGNATURE: George B. Scott DATE: 1/15/82

DD FORM 1694

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER (SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 16 April 1982

PROCURING ACTIVITY NO.: 1-16

1. ORIGINATOR NAME AND ADDRESS: Santa Barbara Research Center, Div. of Hughes Aircraft Co., 75 Coromar Dr., Goleta, CA 93117

2. [X] DEVIATION [ ] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
Flt. I		TM	D-147

5. BASE LINE AFFECTED: [ ] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	MOD. NO.
	51398		

9. TITLE OF DEVIATION/WAIVER: Soldering of two resistors to R130 pads.

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE: 51398 PWB Assy Cal Shutter Backup (A7)

12. CD NO. | 13. DEFECT NO. | CLASSIFICATION OF DEFECT 14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: A7 PWB

16. PART NO. OR TYPE DESIG.: 51398-E

17. LOT NO. | 18. QTY | 19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: None.

21. EFFECT ON DELIVERY SCHEDULE: 2 months if not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.

23. DESCRIPTION OF DEVIATION/WAIVER

Request permission to use select resistors (R130 and R130 B, 698 ohm each) outside of select range list (52732-23). Also request permission to use two resistors instead of one in order to satisfy power derating criteria for the resistors. See dra attached.

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24. NEED FOR DEVIATION/WAIVER

Mechanical adjustment of symmetry is not possible without a minimum of two months schedule delay, so we want to use electrical adjustments instead. The required value of resistance is not on the select list. The power rating is too low for the new resistance value required; therefore, two 698 ohm 1/10 watt resistors are needed.

RE [signature] 4/16/82 QA [signature]

REA [signature] 4/16/82 SYS ENGR [signature] for JEngel 4/16/82 PE [signature] 4/19

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER

26. SUBSTANTIATING ACTIVITY AUTHORIZING SIGNATURE: [signature] for JEngel 4/16/82

TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC

SIGNATURE: George R. Light DATE: 4/16/82

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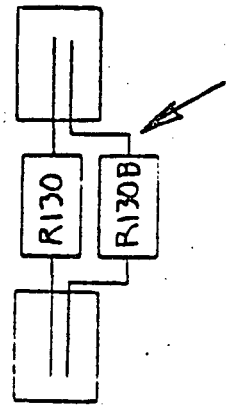

LEAD
BEND RADII
TO BE IN
ACCORDANCE
WITH NHB 5300.4(3A

4/19/82

Program Instruction 010A

REQUEST FOR DEVIATION/WAIVER

6 May 1982

P-F.D

1. ORIGINATING ORGANIZATION
Santa Barbara Research Center
75 Coromar Drive, Goleta CA 93117

2. [X] DEVIATION [ ] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. IDENTIFICATION FOR DEVIATION/WAIVER

a. CONFIG ITEM	b. CAGE CODE	c. DRAWING CLASS	d. DRAWING NO.
FLT-1	11323	TM	D-150

5. PART LINES AFFECTED: [ ] PRIME ITEM [ ] ALLOCATED [X] NEXT HIGHER ASSY

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	CAGE CODE	SPEC./DOC. NO.	REV.
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

CAGE CODE	NUMBER	REV.	SER. NO.
11323	50942	G	

9. TITLE OF DEVIATION/WAIVER
Alternate Wiring

10. CONTRACT NO. & LINE ITEM
N/A

11. CONFIGURATION ITEM (CI) NOMENCLATURE
Printed Circuit Board Assembly

12. CI NO.: II

13. QTY OF CI

14. EFFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR MATERIAL AFFECTED
Temp Controller

16. PART OR IDENTIFYING NO.
50942

17. LOT NO.

18. QTY
1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. DELIVERY OR USAGE AFFECTED
None

21. EFFECT ON DELIVERY SCHEDULE
9 months schedule impact if disapproved

22. EFFECT ON INTERCHANGEABILITY, REPLACEMENT, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER
Alternate wiring (wire jumper/splice and added parts) incorporated on Assembly drawing to accommodate circuit design change. See 50942 assembly drawing and referenced SP 80165 alternate wiring process specification and EO 4343A (does not conform to NHB 5300.4(3A) para. 3A402-4)

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24. REASON FOR DEVIATION/WAIVER
Redesign and re-procurement of electronic circuit board would be required in order to eliminate alternate wiring. Minimum 9 months schedule slip and considerable cost would be involved. Redesign is not considered cost effective at this time.

RE [signature] 5/6/82

QA [signature] 5/6/82

REA [signature] 5/6/82 Sys Engr [signature] 5/6/82 PE [signature] 5-6-82

25. PROPOSED DISPOSITION & RATIONALE

26. NAME (PRINT OR TYPE) [signature]
TITLE Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY
NASA GSFC

SIGNATURE [signature] DATE 5/6/82

DD FORM 1694

GPO: 1979 — 665-705/618

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR -481 FOR INSTRUCTIONS)

DATE PREPARED: 7/7/82

PROCURING ACTIVITY NO.:

1. ORIGINATOR NAME AND ADDRESS
SANTA BARBARA RESEARCH CENTER, 75 Coromar Drive, Goleta, California 93117

2. [X] DEVIATION [ ] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
Flight I	11323	TM	D-159

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED/TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	ADD. NO.
11323	50904	G	4072A

9. TITLE OF DEVIATION/WAIVER
Alternate Wiring

10. CONTRACT NO. & LINE ITEM
NAS 5-24200
Item 32

11. CONFIGURATION ITEM NOMENCLATURE
Electronics Module Assembly

12. ES NO.: II

13. DEFECT NO.:

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED
PWB PostAmp Band 1

16. PART NO. OR TYPE DESIG.
50904-1/G

17. LOT NO.:

18. QTY
1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
None

21. EFFECT ON DELIVERY SCHEDULE
8 mos. schedule impact, if disapproved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER
BAND 1
Alternate wiring (added 16 resistors per A PWB) incorporated an assembly drawing to accommodate circuit design change. See assembly drawing (EO 4515A) and referenced SP80165 alternate wiring process specification. Added resistors to eliminate coherent noise per ER5779.

24. NEED FOR DEVIATION/WAIVER
Redesign and re-procurement of electronic circuit boards would be required in order to eliminate alternate wiring. Minimum 8 months' schedule slip and considerable cost would be involved. Redesign is not considered cost effective at this time.

REA 6/7/82 SYS ENGR 7/7/82 RE 7/7/82 QA 7/7/82 PE 7/7/82 CNO 7-9-82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
51065 S/N 003 only.

26. SIGNATURE AND TITLE OF INITIATING SIGNATORY 9 July 82

Minor - System Engineering
Major/Critical - Program Manager

27. [ ] APPROVAL RECOMMENDED

28. [X] APPROVED [ ] DISAPPROVED

29. GOVERNMENT ACTIVITY: NASA GSFC

SIGNATURE: George P. Britt DATE: 7/9/82

DD FORM 1694

ELECTRONIC MODULE -

523 X7

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SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 0606

ORIGINATOR

1. PROGRAM NAME AND NUMBER: HS 236 | 2. CLA | 3. MODEL: FLIGHT | TIME OBSERVED: 1100 | 4. DATE OBSERVED: 3 28 80

5. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☒ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD	POST AMP & CMD. RELAY A/B	50912	201	HAC
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-ACCORD ☒ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ____ ° ____ ☐ THERMAL VAC ____ HRS. AT ____ ° ____ ☐ CENTRIF ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: STEP 16 MEASURES INFINITE, INSTEAD OF 10K. STEP 35 AND STEP-36 MEASURE INFINITE, INSTEAD OF 10K.

15. TEST PROCEDURE: 16368 | ARA: 4.7.2 | 16. ORIGINATOR: NILE PATTY | ORG: 2213 | DATE: 3-25-80 | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

17. VERIFICATION AND FAILURE ANALYSIS: SCHEMATIC 50913 REV C" INDICATES THE RESISTOR IN STEP 16 IS NO LONGER USED AND K-9 IN STEP 35 & 36 IS NO LONGER CONNECTED. TEST PROCEDURE WILL BE E.O.D TO BRING UP TO SCHEMATIC LEVEL.

18. FAILED ITEM NAME AND PART NUMBER: N/A.

19. ☐ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: NO DEFECT IN HARDWARE, TEST SPEC 16368 IN ERROR.

21. AUTHORIZATION: [signature] | ORG: 2247 | DATE: 3-25-80 | ☐ CONTINUATION SHEET USED

MANUFACTURING/CARD TEST

23. REWORK/RETEST ACTION TAKEN | 24. QA REWORK | 25. QA RETEST

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY: ORG: | 28. RETESTED BY: ORG: DATE: | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: TEST SPEC 16368 WAS IN ERROR. E.O. 9732 DATED 4-24-80 CHANGES PROCEDURE.

33. FRB CLOSURE: HUGHES S&CG FAILURE REVIEW BOARD — Failure Report Closed Date 6/12/80

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP ☐ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/R&R ERROR ☐ WORKMANSHIP ☐ HANDLING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | 34 EFFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] | ORG: 2213 | DATE: 6-5-80 | 38. SPACECRAFT SYSTEM ENGR: [signature] | ORG: | DATE: 6/11/80

39. RELIABILITY: [signature] | ORG: | DATE: 6-5-80 | 40. CUSTOMER OR SUPPLIER: [signature] | DATE: 6/12/80

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HUGHES AIRCRAFT COMPANY

SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 0622

ORIGINATOR

1. PROGRAM NAME AND NUMBER: HS 236TM | 2. GLA | 3. MODEL: FL | 4. TIME OBSERVED: 4PM | 5. DATE OBSERVED: MO 9 DA 5 80

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☒ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD	POST AMP BAND 2	50904-2	2.01	HAC
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN PROGRESS ☒ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ___ ° ___ ☐ THERMAL VAC ___ HRS. AT ___ ° ___ ☐ EMC/EMI ☐ VIBRATION ___ AXIS FOR ___ MIN TYPE ___ ☐ OTHER

14. DESCRIPTION OF FAILURE: ALL 16 CHANNELS EXCEED MAX GAIN OF 20DB FOR MAX BOOST ABOVE THE 100 HZ GAIN.

15. TEST PROCEDURE: 16368 PARA 4.3.8 | 16. ORIGINATOR: N. PATTY | ORG 2213 | DATE 5-6-80 | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VARIFICATION AND FAILURE ANALYSIS: ~~TBD~~

19. FAILED ITEM NAME AND PART NUMBER: NONE

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED (LOCALIZE): RESOLUTION OF FAILURE TO BE ACCOMPLISHED BY CHANGING TOLERANCE OF TEST PROCEDURE 16368 PAR 4.3.8. WITH AN E.O.

21. AUTHORIZATION | ORG | DATE | ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

22. REWORK/RETEST ACTION TAKEN: NO RETEST REQUIRED BECAUSE ORIGINAL SPECS WERE TOO STRINGENT ~~A FAILURE~~ OF CURED BY E.O.

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: ~~THIS IS NOT A FAILURE OF~~ QP

E.O. 9897 CHANGES SPEC. MAX GAIN ALLOWED IS NOW 26 db. MAX TEST GAIN WAS 21.6db. TEST DATA SHEETS ATTACHED

33. FRB CLOSURE

☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☒ TEST EQUIP. ☒ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURES ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: SS D. M. RANDALL | ORG 2123 | DATE 9-17-80

38. SPACECRAFT SYSTEM ENGR: SS S. G. OXLEY | ORG 40-92 | DATE 4-19-8

39. RELIABILITY: [illegible] | ORG 5141 | DATE 9-18-80

40. CUSTOMER OR SUPPLIER: [illegible] | DATE

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FAILURE REPORT

F 1666

ORIGINATOR

1. PROGRAM NAME AND NUMBER: V011	2. GLA	3. MODEL: FLT	4. TIME OBSERVED: A.M.	5. DATE OBSERVED: MO JULY DA 21, YR 1981	
6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☒ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ MICAM ☐ PART					

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	3 dpl	3		
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	BAND 4 POST AMP Bd.	5090 [illegible]	401	SBRS
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROCESS ☒ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ RADIATION ☒ TEMPERATURE 15 °C ☐ THERMAL VAC _____ HRS. AT _____ °C ☐ CYC/PSI ☐ VIBRATION _____ AXIS FOR _____ MIN TYPE _____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CHANNELS 1, 2, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15 & 16 FAIL TO MEET TRANSIENT AND/OR FREQUENCY RESPONSE REQUIREMENTS AFTER SELECT RESISTORS MOVED FROM STANDOFFS TO BOARD.

15. TEST PROCEDURE: 16597 PARA: 4.6 | 16. ORIGINATOR: N. C. DAVIDSON ORG: 2213 DATE: 7-21-81 | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

17. VARIFICATION AND FAILURE ANALYSIS

18. FAILED ITEM NAME AND PART NUMBER

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: TEMPORARILY PLACE BOOST & ROLLOFF RESISTORS ON STANDOFFS. MEASURE RESISTANCE VALUES, TRANSIENT & FREQUENCY RESPONSE (R1-R16 AND R65-R80)

21. AUTHORIZATION: D.M. RANDALL ORG: 21-23 DATE: 7-22-81 | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Calibration was done after taking moisture from FPA and increased flow of N2 when established to the FPA box. Discrepancies in a result of resistors listed on FR 08317. No variation to any components

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	VPR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY _____ ORG _____ DATE _____ | 28. RETESTED BY _____ ORG _____ DATE _____ | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Monitor was confusing on the FPA during select testing due to inadequate N2 gas flow on the FPA. N2 flow had been increased and is now directed to FPA. DE - 12-23-81

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION [illegible]

33. FRB CLOSURE: [signature] 1/18/81

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ D [illegible] ☐ TEST EQUIP ☐ MFG. PROCEDURE ☐ WIRING ERROR ☐ UNKNOWN ☐ ENVIRONMENTAL ☐ TEST PROC. ☐ ASSY/FAB ERROR ☐ ROUGH HANDLING DEFECT CODE ☐ DEFECTIVE PARTS ☒ TEST SET UP ☐ WORKMANSHIP ☐ WEAR-OUT

35. FAILURE TYPE: ☐ PRIMARY ☐ UNKNOWN ☒ INDUCED ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MINOR ☐ MAJOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] ORG 2122 DATE 1/11/1981

38. SPACECRAFT SYSTEM ENGR: [signature] ORG 2241 DATE 12/18/81

39. RELIABILITY: [signature] ORG 5141 DATE 12-18-81

40. CUSTOMER OR SUPPLIER: [signature] DATE 12/21/81

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FAILURE REPORT

F 1667

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM, HS 236 | 2. GLA | 3. MODEL: F1+ | 4. TIME OBSERVED: 9:00A | 5. DATE OBSERVED: MO 9 DA 21 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☒ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	PWB ASSY-Motor Driver, Solder Door	53877	101	
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ CMC/RSI ☐ RADIATION ☐ VIBRATION ☐ TEMPERATURE ____ ° ____ AXIS FOR ____ MIN ☐ THERMAL VAC ____ HRS. AT ____ ° ____ TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: Adjusted Model 2005 Voltage reference to −1.500V, output Was: +5.628 V and Should Be: 0.00 ±0.3V.

15. TEST PROCEDURE: 16237 PARA 3.3.21 | 16. ORIGINATOR: E. Aasted ORG | DATE 9-20-81 | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

17. VERIFICATION AND FAILURE ANALYSIS: Open Circuit on pin 4 of AR1, AR2, and AR3 where an incomplete "cut and jump" had been reworked per EO 2762A. Added resistors were soldered to traces to cut instead of to pad. No overstressed components. | 18. FAILED ITEM NAME AND PART NUMBER

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED ESCAUSE: Rework to Print 53877 and EO 2762A

21. AUTHORIZATION: E. Aasted ORG | DATE 9-21-81 | ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Reworked / To EO 2762A
Functional Test per 16237. Rev F

24. QA REWORK: 178

25. QA RETEST: 178

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.
NONE						

27. REWORK BY: Hortencia Sanchez ORG | DATE 9/21/81 | 28. RETESTED BY: E. Aasted ORG 22-13 | DATE 9-22-81 | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: EO 2762A was not correctly implemented. More careful initial visual check prior to test will identify this problem in future. Mr Jim Duncan has interfaced on this problem and has instructed his engineering to review changes more closely to insure wires from same wire to wiring terminations

31. ☐ CONTINUATION SHEET USED

33. FRB CLOSURE: 10/15/81

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: EO 2762A

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP ☐ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☒ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: D. A. Bonacho ORG 22-13 | DATE 9-28-81 | 38. SPACECRAFT SYSTEM ENGR: [signature] ORG 22-4 | DATE 10/6/81

39. RELIABILITY: A. Wheeler ORG 51-11 | DATE 10-5-81 | 40. CUSTOMER OR SUPPLIER: N/A | DATE

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FAILURE REPORT

F 1668

1. PROGRAM NAME AND NUMBER: TM, HS-236 | 2. GL | 3. MODEL: F/t. | 4. TIME OBSERVED: 9:00A | 5. DATE OBSERVED: MO 11 DA 18 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☒ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	PWB ASSY, Temp. Control	50920	101	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

ORIGINATOR

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROGRESS ☒ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ___ ° ___ ☐ THERMAL VAC ___ HRS. AT ___ ° ___ ☐ PRESS ☐ VIBRATION ___ AXIS FOR ___ MIN TYPE ___ ☐ OTHER

14. DESCRIPTION OF FAILURE: Mean resistance of values determined in 4.3.2 and 4.3.3 is not within specification limits, nor is it capable of being corrected per 10.1.5.3. Mean Value is 12.77KΩ Should Be 10.41KΩ.

15. TEST PROCEDURE: 16236 PARA: 4.3.4 | 16. ORIGINATOR: E. Aasted ORG: 2213 DATE: 11/18/81 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Reworked To Print. R2 was 12.7KΩ instead of 10.7KΩ per print. R68 in a similar circuit was reworked as well. No overstress on any components.

19. FAILED ITEM NAME AND PART NUMBER: R2 and R68.

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ RETEST NOT REQUIRED BECAUSE: Retesting already written in planning.

21. AUTHORIZATION: E. Aasted ORG: 22-13 DATE: 11/18/81 | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: R2 and R68 removed and replaced with components per 50920 assembly print. Para 4.3 successfully performed.

24. QA RECORDS: 110

25. QA RETEST: 110

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY: M. Guerra ORG: 22-74 DATE: 11-18-81 | 28. RETESTED BY: E. Aasted ORG: 22-13 DATE: 11/18/81 | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Assy component placement error. The value of the installed resistor was higher than print called. This resistor is in series with a 10K resistor. The power dissipated across the resistors, V²/R, was reduced, thereby eliminating the possibility of overstress. Technicians have been cautioned to check that proper values are fitted.

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

33. FRB CLOSURE: 6/2/11

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ TEST EQUIP ☐ MFG. PROCEDURE ☐ WIRING ERROR ☐ UNKNOWN ☐ ENVIRONMENTAL ☐ TEST PROC. ☒ ASSY/FAB ERROR ☐ ROUGH HANDLING ☐ DEFECTIVE PARTS ☐ TEST SET-UP ☐ WORKMANSHIP ☐ WEAR-OUT | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ UNKNOWN ☐ INDUCED ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MINOR ☐ MAJOR ☐ SAFETY

37. RESPONSIBLE ENGINEER/LIABILITY: A. Benoche ORG: 9.2-13 DATE: 12/15/81

38. SPACECRAFT SYSTEM ENGR: for J. Engel ORG: SBRC DATE: 12/2/81

F1668

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11/17/81	DATE
101	SER NO.
1	SET NO.

SMA HEATER CONTROLLERS

4.3.1 + 80 V Line Current ✓ (≤ 1.0 mA) LED IS ON OK (OK)
+ 28 V Line Current ✓ (≤ 1.0 mA)
+ 21 V Line Current 22.96 mA (25 ± 10 mA)
- 21 V Line Current 2.93 mA (5 ± 4 mA)

4.3.2 + 80 V Line current ✓ (≤ 1.0 mA)
+ 28 V Line Current 1099 mA (800/1000/1300 ± 150 mA)
+ 21 V Line Current 23 mA (25 ± 10 mA)
- 21 V Line Current 2.9 mA (5 ± 4 mA)
R1 ~~12.84K Ω~~ 10.38K Ω +Z HEATER 27.18 V +Z COMP 1.39 V +Z RET .32 V TOGGLE OK (OK)

4.3.3 R2 ~~11.744K Ω~~ 10.337K Ω +Z HEATER 0.0 V +Z COMP .271 V +Z RET 28.11 V

4.3.4 Mean (R1 + R2)/2 10.359K Ω (10.41 K Ohms ± 84 Ohms)
Difference (R1 - R2) 45 Ω (210 Ohms maximum)

4.3.5 + 80 V Line Current ✓ (≤ 1.0 mA) LED IS OFF OK (OK)
+ 28 V Line Current ✓ (≤ 1.0 mA)
+ 21 V Line Current ✓ (≤ 1.0 mA)
- 21 V Line Current ✓ (≤ 1.0 mA)

4.3.6 + 80 V Line Current ✓ (≤ 1.0 mA) LED IS ON OK (OK)
+ 28 V Line Current ✓ (≤ 1.0 mA)
+ 21 V Line Current 18.65 mA (25 ± 10 mA)
- 21 V Line Current 2.7 mA (5 ± 4 mA)

4.3.7 + 80 V Line Current ✓ (≤ 1.0 mA)
+ 28 V Line Current 1130 mA (800/1000/1300 ± 150 mA)
+ 21 V Line Current 14.6 mA (25 ± 10 mA)
- 21 V Line Current 2.8 mA (5 ± 4 mA)
R1 10.382K Ω -Z HEATER 27.18 V -Z COMP 2.333 V -Z RET .291 V TOGGLE ✓ (OK)

4.3.8 R2 10.309K Ω -Z HEATER -0.001 -Z COMP .269 V -Z RET 28.14 V

4.3.9 Mean (R1 + R2)/2 10.345K Ω (10.41 K Ohms ± 84 Ohms)
Difference (R1 - R2) 73 Ω (210 Ohms maximum)

4.3.10 + 80 V Line Current ✓ (≤ 1.0 mA) LED IS OFF OK (OK)
+ 28 V Line current ✓ (≤ 1.0 mA)
+ 21 V Line Current ✓ (≤ 1.0 mA)
- 21 V Line Current ✓ (≤ 1.0 mA)

Sheet 6

PART NO. 50920			PART NAME PWB ASSY, Temperature Control	ASSY/LOT SERIAL NO. 101	QTY
OPER NO.	DATE	OPERATOR OR INSP	COMMENTS, TEST DATA, ETC	DISPOSITION	APPROVAL
1520	11/18/81	E. Hasted	1) Lift one leg of R2 for a measurement of its resistance. Refer to ER 1668.	P.E. Verify Value of R2 -	
			2) Return to test for trouble shooting.		
			RETURN TO MFG. ENG.		
	11/18/81	Adams	Lifted one leg of R2		
1520	11/18/81	E. Hasted	~~Rework to print~~ R2 and R68	P.E. Mfg Eng'g Comm	
	11-18-81		both are 12.7K$ and should be 10.7K.	To Rework & Provide	
	11-18-81	Rivera	replaced R2 & R68	Planning	
1520	11/18/81	E. Hasted	Change select nominals as follows:		
			R102 From: 287 Ω To: 523 Ω		
			R127 From: 287 Ω To: 487 Ω		
			per para 10.1.5.3 of spec 16236		
	11/19/81	Buckley	Reworked above		
1520	11/18/81	E. Hasted	Change select nominals as follows:		
			R102 From: 523 Ω To: 619 Ω per spec 16236 10.1.5.3		
			R127 From: 487 Ω To: 590 Ω per spec 16236 10.1.5.3		
			R45 From: 18.2K Ω TO: 17.8K Ω per spec 16236 10.1.6.3		
	11/19/81	Buckley	Changed above nominals		

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F 1668

DEC FORM NO 0214 (4 73)

HUGHES
HUGHES AIRCRAFT COMPANY

SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 1761

1. PROGRAM NAME AND NUMBER: HS 236 TM	2. GLA	3. MODEL: PF	4. TIME OBSERVED: 1530	5. DATE OBSERVED: MO 12 DA 27 YR 80	
6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☒ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART					

ORIGINATOR

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	POST AMP-BAND 1	50904-1 A	101	HAC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMPERATURE ____ ° ____ AXIS FOR ____ MIN ☐ THERMAL VAC ____ HRS. AT ____ ° ____ TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: OFFSET LIMITS OUT OF SPEC ON ELEVEN CHANNELS

Nile Patty

15. TEST PROCEDURE: 16597 4, 4 PARA | 16. ORIGINATOR: NILE PATTY ORG 2122-3 DATE 12-27-80 | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VARIFICATION AND FAILURE ANALYSIS

19. FAILED ITEM NAME AND PART NUMBER

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: This failure occurred when the PWB was first energized. The PWB was replaced by SN 201 and SN 101 became flight. This PWB has bad DC offset voltages at pin #1 and #2 on the flight board assy and does not meet spec.

21. AUTHORIZATION: W M Randall ORG 2122 DATE 11/18/81 | ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: DC offset voltages redetermined with Flight Band 1 Board and Assy. Tested within specification. No overstress of any components. — M.S. 11-19-81 — M.S. 11-19-81

24. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY ____ ORG ____ DATE ____ | 28. RETESTED BY ____ ORG ____ DATE ____ | ☐ CONTINUATION SHEET USED

ENGINEERING LIABILITY

30. CAUSE AND CORRECTIVE ACTION: Could not be accomplished until Flight Band 1 Board Assy was available. THE FLIGHT PWB (S/N 201) WAS USED FOR P.F. BECAUSE OF SCHEDULE CONSIDERATIONS. SELECTS FOR THE CURRENT FLIGHT PWB (S/N 101) HAD TO BE REDETERMINED TO BE COMPATIBLE WITH BAND 2 PREAMP TO MEET SPEC. REQMTS. NO CORRECTIVE ACTION REQ'D. | ☐ CONTINUATION SHEET USED

33. FRB CLOSURE: 11/19/81

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP ☐ TEST PROC. ☐ TEST SET-UP ☒ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☒ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: W M Randall ORG 2122 DATE 11/18/81 | 38. SPACECRAFT SYSTEM ENGR: [signature] ORG 122-41 DATE 11/19/81

39. RELIABILITY: [signature] ORG 19-41 DATE 11/19/81 | 40. CUSTOMER OR SUPPLIER: ____ DATE ____

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SPACE AND COMMUNICATION GROUP
EQUIPMENT CHECKOUT
FAILURE REPORT
CONTINUATION SHEET

F1761 — FR SERIAL NO.
CONT. SHEET LETTER*

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

ADDITIONAL F CONTINUATIOI SHEET(S) USED

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN, DATE EACH ENTRY.

30	ORIGINALLY THE PWB WAS TRIMMED FOR PROTOFLIGHT. SUBSEQUENTLY IT WAS REMOVED AND PUT ONTO THE FLIGHT UNIT, THEREFORE THE ORIGINAL SELECTS HAD TO BE RE-TRIMMED. 11/23/81

16060A SC AUG 78

COPY 1 ROUTE WITH DISCREPANT ITEM

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SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 1769

ORIGINATOR

1. PROGRAM NAME AND NUMBER: HS 236 | 2. GLA | 3. MODEL: FLIGHT | 4. TIME OBSERVED: 1500 | 5. DATE OBSERVED: MO 3 DA 25 80

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☒ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY	BAND 4 POST AMP			
10. ☐ MODULE ☐ MICAM ☒ CARD		50964-A3 AA	201	HAC
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ ENC/PRI ☐ RADIATION ☐ VIBRATION ☐ TEMPERATURE ____ ° ____ AXIS FOR ____ MIN ☐ THERMAL VAC ____ HRS. AT ____ ° ____ TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CHANNEL SEVEN SINGLE ENDED OUTPUT IS REDUCED 7.2 DB WHEN VAL IS DISCONNECTED, 5.1 DB WHEN VOT IS DISCONNECTED. SHOULD BE 6 ± 0.5 DB.

15. TEST PROCEDURE: 6368 4.3.6 | 16. ORIGINATOR: NILE PATTY 27L ORG 13 DATE 3-26-80 | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: CHANNEL SEVEN SINGLE ENDED OUTPUT MINIMAL DEFECT. RECOMMEND REPLACMENT OF U3. CONFIGURATION DID NOT VARY FROM PRINT. NO OUT OF SPEC POWER WAS APPLIED, THEREFORE NO ELECTRICAL STRESSES COULD HAVE BEEN INDUCED.

19. FAILED ITEM NAME AND PART NUMBER: 50854-4 AC4677-04

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: REPLACE U3 AND RETEST TO 16368 PAR 4.3.6.

21. AUTHORIZATION: [signature] ORG 22-61 DATE 3-26-80 | ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: U3 Replaced and Retested per 16368 Para 4.3.6 ATTACHED AIR SHOWS SUCCESSFUL COMPLETION OF 16368 ON 4-1-80.

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY ____ ORG ____ DATE ____ | 28. RETESTED BY ____ ORG ____ DATE ____ | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: See attached memo HS-236-6824

HYBRID PASSES ACCEPTANCE TEST PROCEDURE BUT FAILS TO PERFORM PROPERLY IN CIRCUIT. SUSPECT BUILDUP OF TOLERANCES. CHANGE OF HYBRID CORRECTS CIRCUIT ANOMALY.

31. ☐ CONTINUATION SHEET USED

33. FRB CLOSURE: [signature] 1/27/81

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☒ DEFECTIVE PARTS ☐ TEST EQUIP ☐ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☒ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] ORG 21-23 DATE 6/25/80

38. SPACECRAFT SYSTEM ENGR: W. H. Mansell ORG SBRC DATE 6/25/80

39. RELIABILITY: [signature] ORG 5191 DATE 6-25-80

40. CUSTOMER OR SUPPLIER: [signature] DATE

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SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company

F1769

INTERNAL MEMORANDUM

TO: Distribution CC:

DATE: 15 May 80
REF: HS-236-6824
REH 80/21
FROM: [redacted]
BLDG. TLR5 MAIL STA. 17
EXT. 2597

SUBJECT: Failure of Hybrid Postamp S/N 84

Ref: FR F1769 Hybrid Postamp P/N 50859-4 (HAC P/N 1950588-100) S/N 84

This hybrid failed during test of the Band 4 postamp PWB P/N 50904-4 S/N 201. Failure mode was "fails single ended output test S/B -6 ± 0.5 db, is VOL disconnected = 7.2 db VOH disconnected = 5.1 db". When tested at Fullerton to the acceptance test procedure the device tested acceptable. I requested that a 100Hz signal be applied to the failed channel and VOH be disconnected after a reference point was determined. This duplicated the card level test that the device failed at SBRC. The test results are as follows:

VOH disconnected = loss of 5.5 db.

VOL disconnected = loss of 6.5 db.

This is very close to the readings recorded at SBRC when the tolorance of the monitoring equipment is taken into consideration. The readings at Fullerton were, in any event, at the limit of the established tolerance of ± 0.5 db. There does not appear to be a specific test that is an equivalent of the single ended output test performed at SBRC. A concensus of opinion is that the common mode rejection test performed at the hybrid level is the same type of test, but there appears to be some question concerning the allowable tolerance.

Mike Slonaker is looking into the details of the test method and parameters. No further analysis is considered necessary at this time. The device was not delidded and is presently being held by SBRC Reliability pending resolution of the failure report.

M. R. Heath
TM Reliability

/tkh
Distribution:

L. Altman
S. Branda
R. Cooley
D. Randall
C. Rodil
M. Slonaker
P. Tannous
L. Wolthausen
System Test Data Library (11 copies)

F1769

THEMATIC MAPPER	HUGHES AIRCRAFT COMPANY FULLERTON MICROELECTRONIC TEST DATA SHEET	DATE: 12/31/79
1050589-100		PAGE 1 OF 2
P/N: 50859-4		P.O. No.
Date Code & S/N 4679-84	POST AMPLIFIER	SPEC NO.: 16075 REV R

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Paragraph No	Results				Limits & Conditions
	Pre Burn-In		Final Elect.		
	CHA	CHB	CHA	CHB	
13.1 Power					
I +15	1.67 ma	1.61 ma	1.68 ma	1.61 ma	< 2 ma
I -15	1.67 ma	1.60 ma	1.69 ma	1.62 ma	< 2 ma
13.2 Preamp Bias					
PL	-4.95 v	-4.93 v	-4.95 v	-4.93 v	-5 ± 10% volts
13.3 Input Balance					
IH + IL	0.5 mv	0.4 mv	0.6 mv	0.4 mv	3.0 mv p-p 100Hz - 100KHz max.
13.4 Low Frequency Gain					
CH - OL 100Hz	9.5 dB	9.3 dB	9.5 dB	9.3 dB	9.7 ± 1 dB
OH + OL	-43 dB	-31 dB	-42 dB	-31 dB	Min. -20db below OH - OL
13.5 Frequency Response and					
13.6 Common Mode Rejection					
OH - OL 5KHz	4.2 dB	4.2 dB	4.2 dB	4.1 dB	+4/+5db ref.100Hz Gain
OH + OL	-36 dB	-32 dB	-35 dB	-31 dB	Min. -20db below OH - OL
OH - OL 10KHz	8.5 dB	8.3 dB	8.7 dB	8.5 dB	+8/+10db ref. 100Hz Gain
OH + OL	-34 dB	-33 dB	-35 dB	-33 dB	Min. -20db below OH - OL
OH - OL 20KHz	14.9 dB	13.8 dB	14.1 dB	13.8 dB	+13/+15db ref.100Hz Gain
OH + OL	-38 dB	-36 dB	-38 dB	-35 dB	Min. -20db below OH - OL
OH - OL 40KHz	18.7 dB	18.4 dB	18.9 dB	18.6 dB	+17/+20db ref.100Hz Gain
OH + OL	-28 dB	-33 dB	-29 dB	-33 dB	Min. -20db below OH - OL
OH - OL 50KHz	18.6 dB	18.5 dB	19.1 dB	18.8 dB	+17/+20db ref.100Hz Gain
OH + OL	-25 dB	-32 dB	-25 dB	-31 dB	Min. -20db below OH - OL

HUGHES AIRCRAFT COMPANY FULLERTON CALIFORNIA	MICROELECTRONIC TEST DATA SHEET	PART NO. 1950508-100
S/N:		PAGE 2 OF 2 — DATE:

F1769

Paragraph No.	Pre Burn-in		Final Elect.		Limits & Conditions
13.5 and 13.6 (cont.)					
OH - OL 60KHz	17.6 dB	17.3 dB	17.8 dB	17.5 dB	+15/+19db ref. 100Hz Gain
OH + OL	-24 dB	-33 dB	-24 dB	-33 dB	Min. -20db below OH - OL
OH - OL 100KHz	8.1 dB	7.6 dB	8.2 dB	7.7 dB	+1/+10db ref. 100Hz Gain
OH + OL 100KHz	-23 dB	-32 dB	-23 dB	-34 dB	Min. -20db below OH - OL
13.7 Supply Voltage Rejection					
OH - OL (+15V)	9 mv	9 mv	8 mv	8 mv	<100 mv p-p
OH + OL (+15V)	11 mv	12 mv	11 mv	12 mv	<100 mv p-p
OH - OL (-15V)	8 mv	7 mv	7 mv	7 mv	<100 mv p-p
OH + OL (-15V)	2 mv	2 mv	2 mv	2 mv	<100 mv p-p
13.8 D.C. Offset					
OH	-16 mv	-5 mv	19 mv	-8 mv	0 ± 340 mv max.
OL	18 mv	12 mv	20 mv	14 mv	0 ± 340 mv max.
13.9 Roll off Terminal Check					
Terminal 56 & 47	13.63 KΩ		13.60 KΩ		12.9K - 15.4K
Terminal 41 & 33	13.65 KΩ		13.63 KΩ		12.9K - 15.4K

Tested by: M Lemus

Quality/Responsible Engineer: K Tanaka SBR 12-12-79

THEMATIC MAPPER	HUGHES AIRCRAFT COMPANY FULLERTON MICROELECTRONIC TEST DATA SHEET	DATE: 4-9-80
1050699-100		PAGE 1 OF 2
P/N: 50899-4		P.O. No.
Date Code & S/N 4679 84	POST AMPLIFIER	SPEC NO.: 16075 REV R

F1769

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Paragraph No.	Results: Pre-Burn-In CHA	Pre-Burn-In CHB	Final Elect. CHA	Final Elect. CHB	Limits & Conditions
13.1 Power					
I +15	1.67mA	1.61mA	_____	_____	< 2 ma
I -15	1.67mA	1.60mA	_____	_____	< 2 ma
13.2 Preamp Bias					
PL	-4.99V	-4.98V	_____	_____	-5 ± 10% volts
13.3 Input Balance					
IH + IL	0.6mV	0.4mV	_____	_____	3.0 mv p-p 100Hz - 100KHz max.
13.4 Low Frequency Gain					
OH - OL 100Hz	+9.5dB	+9.3dB	_____	_____	9.7 ± 1 db
OH + OL	-45dB	-31dB	_____	_____	Min. -20db below OH - OL
13.5 Frequency Response and					
13.6 Common Mode Rejection					
OH - OL 5KHz	+4.5dB	+4.2dB	_____	_____	+4/+5db ref.100Hz Gain
OH + OL	-38dB	-33dB	_____	_____	Min. -20db below OH - OL
OH - OL 10KHz	+9.1dB	+9.0dB	_____	_____	+8/+10db ref. 100Hz Gain
OH + OL	-38dB	-34dB	_____	_____	Min. -20db below OH - OL
OH - OL 20KHz	+14.5dB	+14.4dB	_____	_____	+13/+15db ref.100Hz Gain
OH + OL	-38dB	-36dB	_____	_____	Min. -20db below OH - OL
OH - OL 40KHz	+19.4dB	+19.0dB	_____	_____	+17/+20db ref.100Hz Gain
OH + OL	-29dB	-33dB	_____	_____	Min. -20db below OH - OL
OH - OL 80KHz	+19.5dB	+19.3dB			+17/+20db ref.100Hz Gain
OH + OL	-25dB	-32dB			Min. -20db below OH - OL

	MICROELECTRONIC TEST DATA SHEET	PART NO. 1959033-100
S/R:		PAGE 2 OF 2 DAT

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Paragraph No.	Pre Burn-in		Final Elect.		Limits & Conditions
13.5 and 13.6 (cont.)					
OH - OL 60KHz	+18.2dB	+18.0dB	_____	_____	+15/+19db ref.100Hz Gai
OH + OL	-24dB	-32dB	_____	_____	Min. -20db below OH - 0
OH - OL 100KHz	+18.9dB	+18.5dB	_____	_____	+1/+10db ref. 100Hz Gai
OH + OL 100KHz	-24dB	-32dB	_____	_____	Min. -20db below OH - 0
13.7 Supply Voltage Rejection					
OH - OL (+15V)	8mV	8mV	_____	_____	<100 mv p-p
OH + OL (+15V)	10mV	10mV	_____	_____	<100 mv p-p
OH - OL (-15V)	8mV	7mV	_____	_____	<100 mv p-p
OH + OL (-15V)	2mV	2mV	_____	_____	<100 mv p-p
13.8 D.C. Offset					
OH	-16mV	-5mV	_____	_____	0 ± 340 mv max.
OL	+17mV	+13mV	_____	_____	0 ± 340 mv max.
13.9 Roll off Terminal Check					
Terminal 56 & 47	_____		_____		12.9K - 15.4K
Terminal 41 & 33	_____		_____		12.9K - 15.4K

Tested by: [illegible] / 12-21

Quality/Responsible Engineer: _____

PART NO. 50904-4			PART NAME CWB Assy Customer Spec 1-4	ASSY/LOT SERIAL NO. 201	QTY 1
OPER NO.	DATE	OPERATOR OR INSP	COMMENTS, TEST DATA, ETC	DISPOSITION	APPROVAL
500	3-21-80	H 112	C257 thru 72 missing from Bd	P.R. P.Q.F to Rework to 500 Proceed to oper 500	[illegible] 3-25-80 [illegible]
500	3-25-80	M. Fatty	FAILED TEST 4.3.6(CH.7) EXCEEDS 6.0 ± .45 DB, IS 7.2 DB WHEN V_{OL} DISC., 5.1 WHEN V_{OH} DISC. SEG 1769 gr Bain		
500	3-26-80	R. Baer	REPLACE failed (U3) 50859-4 post-RHP hybrid. ~~1. Inspect installation of new hybrid, for~~	REF FAILURE REPORT 1769 REPLACE U3 AND RETEST TO 16368, PAR 4.3.6 P.E. Planner/Buyer Engineer	[illegible] 3 26
	3-31-80	L King	replaced above		[illegible]
500	MAR 31 1980		INSPECT INSTALLATION OF U3	ff 302310 /s/ Doris L. Ray Hughes Aerospace Corporation	
	4/1/80		M.C.I.		
			RETEST TO 16368 AND CONTINUE OPER 500		
500	4-1-80	M Fatty	RETESTED PER 16368 - OK	PROCEED	[illegible]

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SBRC

ASSEMBLY HISTORY RECORD CONTINUATION SHEET

SHEET 5 OF 9

PART NUMBER	SERIAL OR LOT NUMBER	ASSEMBLY NAME	CONTINUATION OF: AIIR DATED 3-3-80 AIIR SUPPLEMENT NO.
50904-4	201	PWB AYSY POSTAMPLIFIER 1-4	

OPER NO.	S/C NO.	INSTRUCTIONS	PERFORMED BY OPER	PERFORMED BY INSP	DATE	REMARKS
		NOTE: Notify QA & AF prior to start of testing.				
200	22-13	1) Perform initial circuit test at ambient temp-	M. Patty	1123	3-25-80	FAILED TEST PARA 4.3.6 (11,7) FR 7769
		erature per Spec 16368.				
		2) Perform Electrical test per Spec 16597. Para 4.0				OK TO PROCEED WITH TESTING
		3) Select components using Spec 16597 & per B/P				
		note 16 & 22.	M Patty		4-1-80	TESTED ONE 16368 ON
		4) Record selected values on test data sheet with				
		traceability.				
		See MASTER PLANNING Dated 3/25/80				
		for Continuation.				
800	22-14	Kit and enter traceability of selects R1-R16, R17-				
		R32, R65-R80, R81, R96, C33-C46 and C57-C72 on ABC/TI				
		from test data sheets and MR.				
900	51-11	Inspect selects.				

SEE SHEET 6 FOR REMARKS

4-14-80

4-1-80

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FR 7769

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SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 1774

ORIGINATION

1. PROGRAM NAME AND NUMBER: HS 236 TM | 2. GLA | 3. MODEL: FL | 4. TIME OBSERVED: 2 PM | 5. DATE OBSERVED: 5 23 80

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☒ CARD
☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD	POST AMP BAND 7	50908-2	201	HAC
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ ESC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMPERATURE ____ ° ____ AXIS FOR ____ MIN ☐ THERMAL VAC ____ HRS. AT ____ ° ____ TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: ALL 16 CHANNELS EXCEED MAX GAIN OF 20 DB FOR MAX BOOST ABOVE THE 100 HZ GAIN.

ENGINEERING EVALUATION

15. TEST PROCEDURE: 16368 4.3.8 | 16. ORIGINATOR: N. PATTY | 72 ORG 13 | DATE 5-6-80 | ☐ CONTINUATION SHEET USED

18. VARIFICATION AND FAILURE ANALYSIS: FAILURE WILL BE RESOLVED BY CHANGING TOLERANCES IN TEST PROCEDURE 16368 PARAGRAPH 4.3.8

19. FAILED ITEM NAME AND PART NUMBER:

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: RESOLUTION OF FAILURE TO BE ACCOMPLISHED BY CHANGING TOLERANCE OF TP. 16368 PAR 4.3.8 WITH AN E.O.

21. AUTHORIZATION: [signature] ORG 21-23 DATE 5-5-80 | ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: NO RETEST REQUIRED. ORIGINAL SPECS WERE TO STRINGENT. ~~HOPE~~ E.O 9897 RESOLVES PROBLEM.

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY ____ ORG ____ DATE ____ | 28. RETESTED BY ____ ORG ____ DATE ____ | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: ~~THIS IS NOT A FAILURE~~ OR ORIGINAL SPECIFICATIONS WERE TOO STRINGENT. E.O. 9897 CHANGES REQUIREMENTS AND ITEM IS NOW WITHIN SPEC. NEW MAX GAIN IS 26 DB. MAX TEST GAIN WAS 23.2 DB. TEST DATA SHEETS ATTACHED.

33. FRB CLOSURE

☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: E.O 9897

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP ☒ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] ORG 21-23 DATE 5-5-80 | 38. SPACECRAFT SYSTEM ENGR: [signature] ORG 46-76 DATE 9-19-80

39. RELIABILITY: [signature] ORG 21 61 DATE 9-18-80 | 40. CUSTOMER OR SUPPLIER: [signature] DATE

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SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 1776

1. PROGRAM NAME AND NUMBER: HS 236 TM	2. CLA	3. MODEL: F-L	4. TIME OBSERVED: 10 AM	5. DATE OBSERVED: MO. 5 DA. 5 80	

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☒ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD	POST AMB BAND 1	50904-1	201	HAC
11. OTHER				

ORIGINATION

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☒ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMPERATURE ____ ° ____ AXIS FOR ____ MIN ☐ THERMAL VAC ____ TYPE ____ HRS. AT ____ ° ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: ALL 16 CHANNELS EXCEED MAX. GAIN OF 20 DB FOR MAX BOOST ABOVE THE 100 HZ GAIN

15. TEST PROCEDURE: 16368 4.3.8 | 16. ORIGINATOR: N. PATTY | ORG: 2213 | DATE: 5-6-80 | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VARIFICATION AND FAILURE ANALYSIS: RESOLUTION OF FAILURE TO BE ACCOMPLISHED BY CHANGING TOLERANCE OF TEST PROCEDURE 16368 PAR 4.3.8 WITH AN E.O.

19. FAILED ITEM NAME AND PART NUMBER: NONE

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: RESOLUTION OF FAILURE TO BE ACCOMPLISHED BY CHANGING ~~LIMITS~~ TOLERANCES IN T.P. 16368 PARA 4.3.8

21. AUTHORIZATION: [signature] | ORG: 21-23 | DATE: 5-5-80 | ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

22. REWORK/RETEST ACTION TAKEN: NO RETEST REQUIRED. ORIGINAL SPECS WERE TOO STRINGENT. EO 9897 RESOLVES PROBLEM ~~NONE~~

23. QA REWORK

24. QA RETEST

25. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY | ORG | DATE

28. RETESTED BY | ORG | DATE | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

29. CAUSE AND CORRECTIVE ACTION: ~~THIS IS NOT A FAILURE~~ QAP
ORIGINAL SPECIFICATIONS WERE TOO STRINGENT. EO 9897 CHANGES REQUIREMENTS AND PARTS ARE NOW WITHIN SPEC. NEW MAX GAIN ALLOWED IS 26 db, MAX TEST GAIN WAS 21.6. TEST DATA SHEETS ATTACHED

33. FRB CLOSURE

☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: EO 9897

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP ☒ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] | ORG: 21-23 | DATE: 5-5-80 | 38. SPACECRAFT SYSTEM ENGR: [signature] | ORG: 46-41 L | DATE: 9-19-80

39. RELIABILITY: [signature] | ORG: 51-41 | DATE: 9-10-80 | 40. CUSTOMER OR SUPPLIER: G.G. F | DATE:

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SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 1781

ORIGINATION

1. PROGRAM NAME AND NUMBER: HS 236 TM. | 2. GLA: | 3. MODEL: ELT A/W | 4. TIME OBSERVED: 1130A | 5. DATE OBSERVED: YR 80 MO 8 DA 5

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☒ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD	MACRO - DESCREET CKT #1	51795	102	HAC
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROCESS ☒ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ___ ° ☐ THERMAL VAC ___ HRS. AT ___ ° ☐ EMC/RFI ☐ VIBRATION ___ AXIS FOR ___ MIN TYPE ___ ☐ OTHER

14. DESCRIPTION OF FAILURE: PINS 2, 6 AND 10 ON U35 SHORTED TOGETHER.

15. TEST PROCEDURE: 16423 PARA 5.3.3 | 16. ORIGINATOR: J A Banach | ORG 22-13 | DATE 1980-5-8 | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

17. VARIFICATION AND FAILURE ANALYSIS: PHYSICAL EXAMINATION SHOWS NO SOLDERING ~~ERROR~~ OR INSTALLATION DEFECT. PIN 2, 6 AND 10 TO BE LIFTED TO ISOLATE DEFECT.

18. FAILED ITEM NAME AND PART NUMBER:

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: REMOVE SHORT ON PWB TRACES FOR U35 PINS 2,6 &
10 Heatsink removed on MRCO 295760.
Retest per 16423 Para 5.3.3

21. AUTHORIZATION: J A Banach | ORG 22-13 | DATE 5-9-80 | ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Heatsink removed, shorted traces opened
Retest per 16423 Para 5.3.3

24. QA REWORK: [illegible] 11-19-80

25. QA RETEST: [illegible] 11-19-80

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY: A BROWN | ORG 22-17 | DATE 8-21-80 | 28. RETESTED BY: J GUYTON | ORG 22-13 | DATE 11-9-81 | ☐ CONTINUATION SHEET USED

ENGINEERING LIABILITY

30. CAUSE AND CORRECTIVE ACTION: PRINTED WIRING BOARD FABRICATED WITH TRACE ERROR.
CHECK PWB TRACES COMPLETELY PRIOR TO HEATSINK INSTALLATION AND COMPONENT PLACEMENT.
QA - PARTS DISPOSITION THRU MRB SEE NCMR #290489 DATE 5/12/80 (ATTACHED) WITH NO FUTHUR COMPLICATIONS NOTED.
STRESS ANALYSIS REPORT (ATTACHED HS-236-7172) ☐ CONTINUATION SHEET USED

33. FRB CLOSURE: [signature] 11/19/81

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: MRCO 295760, NCRM # 290489 (ATTACHED)

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ TEST EQUIP ☐ MFG. PROCEDURE ☐ WIRING ERROR ☐ UNKNOWN ☐ ENVIRONMENTAL ☐ TEST PROC. ☒ ASSY/FAB ERROR ☐ ROUGH HANDLING ☐ DEFECTIVE PART ☐ TEST SET-UP ☐ WORKMANSHIP ☐ WEAR-OUT | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ UNKNOWN ☐ INDUCED ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☒ CRITICAL ☐ MINOR ☐ MAJOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: J A Banach | ORG 22-13 | DATE 11/17/81

38. SPACECRAFT SYSTEM ENGR: [signature] for [signature] | ORG 22-41 | DATE 11/19/81

39. RELIABILITY: [signature] | ORG 51-41 | DATE 11/19/81

40. CUSTOMER SUPPLIED: | DATE

FORMS INSTRUCTIONS FOR FORM 11628 CS (COMPLETE ONLY APPLICABLE BLOCKS)

DIVISIONAL INSTRUCTIONS PROVIDE INFORMATION.

SPECIFIC WORK STATIONS OR SPECIFIC ORG CODES

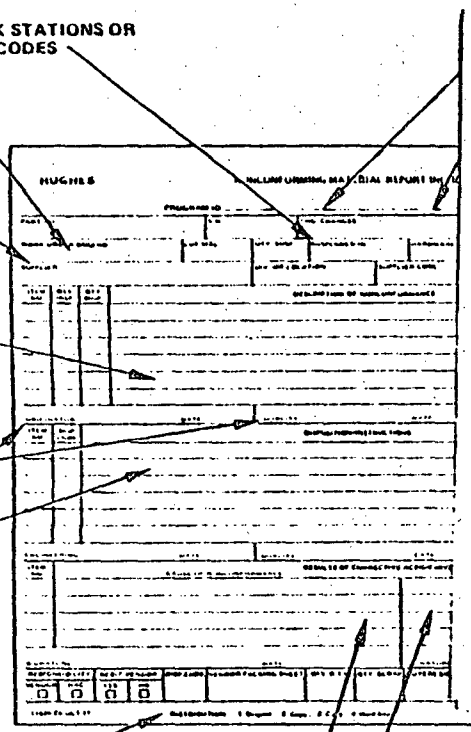
WORK TRANSFER DOCUMENTS ETC.

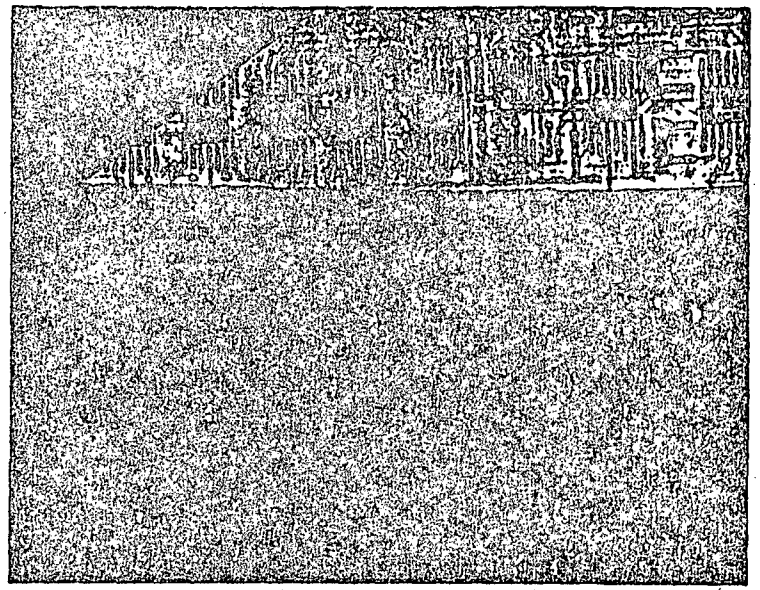
THIS LINE USED BY REC. INSP

SPECIFY CLEAR CONCISE DESCRIPTION OF EACH NONCONFORMITY, INCLUDING:
(1) SERIAL NO.
(2) DRAWING AREA OR LOCATION
(3) IS: S/B TOLERANCES
(4) SPECIFICATION PARA. REF. NO., ETC.

DIVISIONAL PROCEDURES SPECIFY LEVEL OF PERSONNEL REQUIRED

THIS AREA TO BE USED AS NECESSARY TO SPECIFY:
1. REPAIR INSTRUCTIONS
2. REWORK INSTRUCTIONS
3. USE AS IS JUSTIFICATION
4. MRB INSTRUCTIONS





THIS LINE USED BY MATERIEL

DISTRIBUTION DETERMINED BY DIVISIONAL INSTRUCTIONS

WHEN SUPPLIER CORRECTIVE ACTION IS REQUESTED THE SUPPLIER CORRECTIVE ACTION REQUEST (SCAR) IS USED

CORRECTIVE ACTION STATEMENTS SHOULD INCLUDE THE FOLLOWING:
(1) DESCRIPTION OF THE CAUSE OF THE NONCONFORMANCE
(2) ACTION TAKEN TO PREVENT RECURRENCE
(3) EFFECTIVITY OF C/A BY DATE, LOT OR S/N

F 17 21

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NONCONFORMING MATERIAL REPORT (NCMR)

051912
052024

NO. 0489
DATE 5/12/80
PAGE 1 OF 1

PROGRAM ID THEMATIC MAPPER VOL2 YPKG/X-(F)

PART NO.	S/N	ENG. CHANGES	NOMENCLATURE
51195	102		MMRO DISCRETE 1 PWB

WORK ORDER DOC NO.	LOT SIZE	QTY. SUSP	SUSPENDED IN	HARDWARE I.D. NO.	REF. DOCUMENTS
	1	1	TEST		

SUPPLIER	DIV. OR LOCATION	SUPPLIER CODE	P.O. NO	ITEM NO.	R.R. NO.
HAC E/S			PA 1388		

ITEM NO.	QTY INSP.	QTY SUSP.	DESCRIPTION OF NONCONFORMANCE	RESP. DEPT.	PRIOR OCCUR	M.R. LEVEL	CODE
1	1	1	SHORTED TRACE FARSIDE IN AREA OF COMPONENT U-35. (FEEDTHRU HOLES ACROSS PINS 2 & 6) SEE X-RAY PROVIDED.		YD	MKB	

ORIGINATOR M. Sawicki DATE 5/12/80 QUALITY [signature] DATE 5-22-80 ENGINEERING [signature] DATE 5/22/80

ITEM NO.	DISP. CODE	DISPOSITION/INSTRUCTIONS	STAMP
1	1	REMOVE H/S FROM PWB FOR FURTHER EVALUATION, PER MIR 1107. RETURN TO MKB	1107
		(X) PROCEED AT DOT MFR WITH [illegible]	

ENGINEERING [signature] DATE 5/22/80 QUALITY [signature] DATE 6-11-80 (B) CUSTOMER V. Zeller PFUA DATE 10/23/81

ITEM NO.	CAUSE OF NONCONFORMANCE	RESULTS OF CORRECTIVE ACTION INVESTIGATION	CORRECTIVE ACTION
1	ISOLATED ERROR CAUSED BY SILK SCREEN PROCESSING AT PWB MANUFACTURER.	Isolated process error not expected to be repetative	

SIGNATURE [signature] DATE 10-23-81 SIGNATURE [signature] DATE 10-23-81

RESPONSIBILITY		DEBIT VENDOR		DISP CODE	VENDOR PACKING SHEET	QTY. R.T.V.	QTY. SCRAP	BUYERS SIGNATURE	DATE	COPY
VENDOR	HAC	YES	NO							
☐	☐	☐	☐							

F178

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F1781

MATERIAL REVIEW CONTROL ORDER **MRCO**

3	0	0	4	8	9	R
W/A	V	0	1	2		

CONTINUATION SHEET

PAGE 2 OF ___

	OPR NO.	INSTRUCTIONS	DATE	QTY ACC	QTY SUS	INSP OPER	COMMENTS
2214	600	1). CLEAN SURFACES OF ITEMS 1 & 2 PER SP 80030, PARA 3.3.9.1 & BIP NOTE (17).	10/22/97			STARK	
		2). PAINT BONDING SURFACE OF H/S PER SH 80145 TYPE 1 & BIP NOTE (17) CURE 1 HRS. AT 250°F					MIX NO. 5320
		3). BOND ITEMS 1 & 2 PER SP 80042 & BIP NOTE (13). USE TOOLING # V012-5350 MAINTAIN DIM's. of SHT. 3 SEC. B-B CURE 4 HRS. AT 110°F					MIX NO. 5321
SI-11		INSPECT ABOVE ACTIVITIES.	10/27/97	1	⌀	195	
GSI		MCI.	10/22/97			075	
LAST OPR		RETURN THIS CARD TO MATERIAL REVIEW FOR RECORD CLEARANCE.		1107			

SB 0344-B-1 FEB 78 Received & Reviewed 9/2/80

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F178

MATERIAL REVIEW CONTROL ORDER

MRCO 300489

W/A V01

PART NO. 51795 REVISION ____

PART NAME MACRO DISCRETE NO 1 PWB

QUANTITY 1 S/N 102

ROUTE TO: RM 5322 P.O. MASTER CLEARED ____

S/C	OPR NO.	INSTRUCTIONS	DATE	QTY ACC	QTY SUS	INSP OPER	COMMENTS
22-14	100	REMOVE HEATSINK FROM PWB	6/19/80			STAMP	
	200	INSPECT AND IDENTIFY SHORT	6/19/80 AUG 21 1980			127	DETERMINE CAUSE OF SHORT
	300	REMOVE SHORT	8/21/80				
	400	INSPECT	AUG 21 1980			113	
	500	MCI	9/22/80	0	1		INSUFFICIENT PWB INSTRUCTIONS FOR CLEANING & BONDING THE HEAT SINK TO THE
	600	BOND HEATSINK TO PWB	9/25/80	1	0	9719	SEE CONTINUATION FOR ADDITIONAL
		CURE HRS 2					MIX NO.
	700	INSPECT					
LAST OPR		RETURN THIS CARD TO MATERIAL REVIEW FOR RECORDS CLEARANCE		1107			

SB 0344-B-1 FEB 78

QA APPROVAL [signature] DATE 6/16/80

ENG APPROVAL [signature] DATE 5/22/8

F1781

```
T3
TEST PROGRAM NO. 3  - - - - > MACRO DISCRETE CMD. TEST - CH #1
                              SENDS ALTERNATING BIT PATTERN TO
                              BOARD AND VERIFIES PROPER OPERATION


ENTER OPERATOR DATA, YES OR NO ! N

PRINT VERIFICATION ERRORS, YES OR NO ! Y

CURRENT CYCLE COUNT IS : 0000000050

CURRENT ERROR COUNT IS : 0000000000

MONITOR

T3
TEST PROGRAM NO. 3  - - - - > MACRO DISCRETE CMD. TEST - CH #1
                              SENDS ALTERNATING BIT PATTERN TO
                              BOARD AND VERIFIES PROPER OPERATION


ENTER OPERATOR DATA, YES OR NO ! Y

ASSY. NO.: ------ 51795
CARD NAME: ------ MACRODISCRETE CMD GEN #1
SERIAL NO.: ----- 102
DATE & TIME: ---- NOV 15 '81 9:11
PRI. OR RDT.: --- RDT
TEST OPERATOR: -- J BANACH
OTHER TEST
CONDITIONS: ----- LIFE CYCLE TESTING AT AMBIENT (RDT)


TO START TEST EXECUTION
PRESS "G" KEY.

(TO TERMINATE TEST PRESS "ESC" KEY.)
G

PRINT VERIFICATION ERRORS, YES OR NO ! Y


CURRENT CYCLE COUNT IS : 0001011026

CURRENT ERROR COUNT IS : 0000000000

 - - TESTING COMPLETED - -

DATE & TIME: ---- NOV 17 '81 8:05
PRI. OR RDT.: --- RDT
TEST OPERATOR: -- J BANACH
OTHER TEST
CONDITIONS: ----- LIFE CYCLE TESTING AT AMBIENT (RDT)
```

F1781

```
HH)>5=9%Q=IJRT)>>5RZ)WHH)>>5=9%Q=IJRT)>>5RZ)>


MONITOR

T3
TEST PROGRAM NO. 3  - - - - - > MACRO DISCRETE CMD. TEST - CH #1
                                SENDS ALTERNATING BIT PATTERN TO
                                BOARD AND VERIFIES PROPER OPERATION


ENTER OPERATOR DATA, YES OR NO ! Y

ASSY. NO.: ------ 51795
CARD NAME: ------ MACRO DESCRETE CMD GEN #1
SERIAL NO.: ----- 102
DATE & TIME: ---- 13 NOV '81   10:07
PRI. OR RDT.: --- PRI
TEST OPERATOR: -- J GUYTON
OTHER TEST
CONDITIONS: ----- LIFE CYCLE TESTING AT AMBIENT (PRI)


TO START TEST EXECUTION
PRESS "G" KEY.

(TO TERMINATE TEST PRESS "ESC" KEY.)
G

PRINT VERIFICATION ERRORS, YES OR NO ! Y




CURRENT CYCLE COUNT IS : 0001007810

CURRENT ERROR COUNT IS : 0000000000

 - - TESTING COMPLETED - -

DATE & TIME: ---- 15 NOV '81  8:56
PRI. OR RDT.: --- PRI
TEST OPERATOR: -- J BANACH
OTHER TEST
CONDITIONS: ----- LIFE CYCLE TESTING AT AMBIENT (PRI)
```

F1781

SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company

INTERNAL MEMORANDUM

TO: L. O'Connell CC: Distribution

DATE: December 8, 1981
REF: HS236-7762
RE/AH 81/66
FROM: A. Huber

SUBJECT: Failure Report, F1781 (Macrodiscrete Command Generator Board No. 1, Flt)

BLDG. B11 MAIL STA. 102
EXT. 6246

FR: F1781, dated 5/8/80

The failure was encountered during board test of the macrodiscrete command generator No. 1 board (assy. No. 51795), with the board heat sink plate mounted to the board. It was found that three outputs (pins 2, 6, and 10) of flatpack U35 (54L04) were shorted together. The short-circuit was not visible on the top, component-side of the board; x-ray photographs of the board revealed the short-circuit to exist on the bottom-side, and to consist of an extraneous interconnecting trace. The heat sink was removed to accomplish the repair. After the repair was made the board functioned properly. It is believed that no overstress occurred and that replacement of U35 is not warranted.

The three outputs which were shorted together are designated U35B, U35C, and U35E and are shown in Figure 1. Two of the outputs (designated 'enable'; U35B and U35C) have an identical input signal and produce identical output signals; they function to strobe data into the register shown in Figure 1 upon receipt of an enable signal. The third output signal produces a reset signal to reset the register upon completion of processing. All three outputs are normally in the high-state.

When the board is tested and a macrodiscrete command is issued by the test set, an enable signal is issued, causing the outputs of U35B and U35C to go to the low-state, as shown in Figure 1, case A. Since the reset signal (U35E) is in the high state, the two enable outputs attempt to pull the reset output to the low-state. The resulting maximum stress is that of having one output shorted to signal ground. This is not a condition of overstress; the manufacturer states that one output can be shorted-circuited to signal ground indefinitely.

The test set issues enable signals (70 microseconds in duration) at 100 millisecond intervals. Approximately 40 milliseconds after the occurrence of an enable signal, a reset signal is issued. The reset signal causes the U35E output to go to the "low state", as shown in Figure 1, case B. Since the two enable outputs (U35B and U35C) are in the high-state, an attempt is made to pull the enable outputs to the low-state. The resulting theoretical maximum stress is that of having two outputs in the same flatpack, short-circuited to signal ground.

F1781

The maximum short-circuit output current of a 54L04 is 15 ma. For two outputs short-circuited to signal ground the total current is 30 ma. It is believed that 30 ma (plus an additional 4.32 ma of loads from gates connected to the three outputs) is beyond the sink current capability of U35E, which has a guaranteed capability of at least 2.0 ma. However, if U35E is capable of this current, the resulting stress would not be excessive. For example, the maximum additional power increase with two outputs short-circuited (neglecting the 4.32 ma of external loads) is 150 mw (5v x 30 ma). For an assumed thermal resistance of 150° C/W, junction-to-ambient, the maximum increase in junction temperatures would be +22.5°c, resulting in junction temperatures of +45.5°c (+22.5°c temperature rise above a +23° c ambient). Since the part is capable of operation at +125°c, the resulting stress would not have been excessive.

Andrew E. Huber
A. Huber

Distribution: Altman, L.
Banach, J.
Barnett, G. C.
Day, J. G.
Evans, D.

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HUGHES AIRCRAFT COMPANY

SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 1783

ORIGINATION

1. PROGRAM NAME AND NUMBER	2. CLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED MO	DA	YR
MS 236 TM.		FLT ATP	8 30A	5	9	80

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☒ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD	MACRO DESCRET NO 1	51795	102	HAC
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROCESS ☒ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ___ ° ___ ☐ THERMAL VAC ___ HRS AT ___ ° ___ ☐ EMC/RFI ☐ VIBRATION ___ AXIS FOR ___ MIN TYPE ___ ☐ OTHER

14. DESCRIPTION OF FAILURE: NO CLOCK INPUT TO U8 (PIN 7) & U7 (PIN 1)

15. TEST PROCEDURE 16423 PARA 5.3.3 | 16. ORIGINATOR [signature] ORG 1224-3 DATE 5/9/80 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: EXAMINATION OF ARTWORK REVEALS THAT BOTH OR-7 AND U7-1 AND ISOLATOR DUE TO AN ERROR IN ARTWORK

19. FAILED ITEM NAME AND PART NUMBER

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: INSTALL JUMPER PER E.O. 9902 AND RETEST

21. AUTHORIZATION | ORG | DATE | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Installed Jumper and retested

24. QA REWORK: R [illegible]

25. QA RETEST: R [illegible]

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: DEFECTIVE ARTWORK —

DOES AND ED 9902 CORRECTS ARTWORK
Serial Effectivity S/N 002 & up

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

33. FRB CLOSURE [signature] 6/17/81

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP ☐ TEST PROC. ☐ TEST SET UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER [signature] ORG 22-17 DATE 8-13-80

38. SPACECRAFT SYSTEM ENGR [signature] ORG 2261 DATE 810617

39. [signature] ORG 51-64 DATE 6-17-81

40. CUSTOMER OR SUPPLIER HB 6/17/81 DATE

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1733

ENGINEERING ~~ORDER~~/REVISION ~~NOTICE~~ NO. 7702

SHEET 1 OF 1

DRAWING TITLE	DRAWING NUMBER
F.E. ASSY VHSRD DISCRETE COMMAND NO. 1 (ARS) (RE)	51795 (B)

PROJECT NUMBER	ITEM DISPOSITION	CLASS CHANGE	DRAWING TYPE
2-1162	REWORK [X] ITEMS CONFORM [ ] NO ITEMS MADE [ ] REJECT [ ] USE [ ] NOT APPLICABLE [ ]	I [ ] II [X]	A [ ] B [ ]

EFFECTIVITY	AUTHORIZING ECR NUMBER
SERNO 002 & SUBQ	TM1663/C1

DESCRIPTION OF CHANGE

1) ADDED ITEM TO LM.

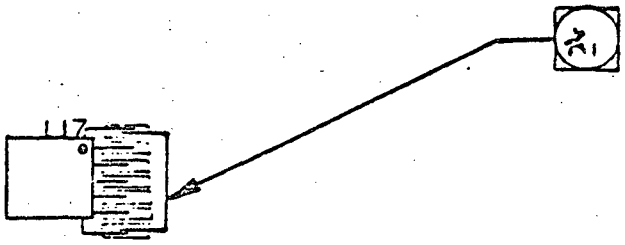
IS: FE J-W-1177/15 WIRE, INSUL, AWG 30, CL 220, TYPE M (J-W-1177)-X

2.) ADDED NOTE. (*1).

IS: INSTALL WIRE ITEM * BETWEEN PADS OF U7-1 AND U7-7.

3.) ADDED NOTE CALLOUT TO SHT 2 ZONE 3D AND WIRE DEPICTION.

IS:



"*" NOTE AND/OR ITEM NUMBER TO BE ASSIGNED AT TIME OF INCORPORATION.

PREPARED BY	DATE	QUALITY APPROVAL	DATE	RELEASED BY	DATE
[illegible]	10-5-8	[illegible]	[illegible]	[illegible]	[illegible]
CHECKED BY	DATE	MANUFACTURING APPROVAL	DATE	INCORPORATED BY	DATE
[illegible]	10-5-8				
REA/PSA APPROVAL	DATE	PROJECT APPROVAL	DATE	DRAWING REV LETTER	
[illegible]	10-5-8	[illegible]	10-5-8		

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR -481 FOR INSTRUCTIONS)

1783

1. ORIGINATOR NAME AND ADDRESS

HUGHES AIRCRAFT COMPANY (SBRC)

2. [X] DEVIATION [ ] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER				5. BASE LINE AFFECTED	6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED
a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.	[X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT	[ ] YES [X] NO
PFSF	11323	TM	D065		

7. SPECIFICATIONS AFFECTED-TEST PLAN				8. DRAWINGS AFFECTED			
	MFR. CODE	SPEC./DOC. NO.	SCN	MFR. CODE	NUMBER	REV.	NOR. NO.
a. SYSTEM							EO 8976, 9302,
b. ITEM				11323	51795	B	9578, 9669, 9822,
c. TEST PLAN							9902, 1422A

9. TITLE OF DEVIATION/WAIVER

ALTERNATE WIRING

10. CONTRACT NO. & LINE ITEM

NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE

ELECTRONICS MODULE ASSEMBLY

CLASSIFICATION OF DEFECT		
12. CD NO.	13. DEFECT NO	14. DEFECT CLASSIFICATION
II		[X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED	16. PART NO. OR TYPE DESIG.	17. LOT NO.	18. QTY	19. RECURRING DEVIATION/WAIVER
MACRO DISCRETE COMMAND NO. 1.	51795		-4-	[ ] YES [X] NO

20. EFFECT ON COST/PRICE

21. EFFECT ON DELIVERY SCHEDULE

5 Months schedule impact if disapproved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.

23. DESCRIPTION OF DEVIATION/WAIVER

Alternate wiring (artwork error - trace omitted on A/W) incorporated on assembly drawing to accommodate circuit design changes. See 51795 assembly drawing and referenced SP80165 alternate wiring process. specification attached. See also EO 9902.

24. NEED FOR DEVIATION/WAIVER

Redesign and re-procurement of electronic circuit boards would be required in order to eliminate alternate wiring. Minimum 5 months schedule slip and considerable cost would be involved. Redesign is not considered cost effective at this time.

RE P.L. Seeley
QA
RE SYS ENGR J.L. Engel PE W.K. Tennant

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER

S/Ns 101, 102, 201, 202

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE J.L. Engel 8/19/80 TITLE Minor - System Engineering Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY NASA GSFC

SIGNATURE George B. Litt DATE 8/20/80

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FAILURE REPORT

F 2722

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED MO DA YR
TM PL1162	V411	PFLT	8:10	12 23 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☑ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD	Calibration Shutter Main	50916	201	SBRC
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROCESS ☒ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ___ ° ___ ☐ THERMAL VAC ___ HRS. AT ___ ° ___ . ☐ ESS/RPI ☐ VIBRATION ___ AXIS FOR ___ MIN TYPE ___ ☐ OTHER

14. DESCRIPTION OF FAILURE: Observed improper waveform during Test 16238 Par 3.3.4
Upon visual Rectification Found Trace CUT between AR4-3 and R48

15. TEST PROCEDURE 16238 PARA 3.3.4 | 16. ORIGINATOR Lloyd Crane ORG 2213 DATE 12/23/81 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Repair CUT Trace, Trace CUT in Error during manufacturing No overstress, Signal is a input

19. FAILED ITEM NAME AND PART NUMBER

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Repair CUT Trace, ReTest per 16238 3.3.4.

21. AUTHORIZATION L Crane ORG 2213 DATE 12/23/81 | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

22. REWORK/RETEST ACTIONS TAKEN: Installed Jumper Wire on CUT Trace
ReTested Per TP 16238 Para. 3.3.4

23. GA RCVD 107 1/6

24. GA RETEST 107 1/6

23. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY M. Davis ORG 2274 DATE 1-7-82 | 28. RETESTED BY L Crane ORG 2213 DATE 1/18/82 | 29. ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: OPERATOR ERROR CAUSED CUT AT WRONG TRACE DURING REWORK PER EO9425. OPERATOR AND SUPERVISOR CAUTIONED. eDM Lemon 2/8/82

31. ☐ CONTINUATION SHEET USED

33. FRB CLOSURE: 2/11/82

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP ☐ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN

DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER J.A. Crane ORG 2213 DATE 1/27/82 | 38. SPACECRAFT SYSTEM ENGR J.A. Crane ORG 2241 DATE 2/12/82

39. RELIABILITY ORG ___ DATE ___ | 40. CUSTOMER OR SUPPLIER D.G. 2/16/82 DATE ___

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HUGHES AIRCRAFT COMPANY

SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 2723

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED MO DA YR
TM PL1162	V411	FLT	8:30	12 23 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☒ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD	Calibration Shutter Main	50916	201	SBRC
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROCESS ☒ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ____ ° ____ ☐ THERMAL VAC ____ HRS. AT ____ ° ____ ☐ EMC/RFI ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: Observed improper current peak amplitude.

15. TEST PROCEDURE: 16238 PARA: 3.3.8 16. ORIGINATOR: Lloyd Evans ORG: 2213 DATE: 12/23/81 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Incorrect Values For Resistors R119 & R109 are 5.1Ω Should be 5.1KΩ

19. FAILED ITEM NAME AND PART NUMBER:

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Remove & Replace R119 & R109 Per Assembly drawing 50916 Replace due To overstress Q12 & Q14, Replace due To possible overstress Q13, Q15 Q18, Q21, Q11

21. AUTHORIZATION: L Evans ORG: 2213 DATE: 12/23/81 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Removed & Replaced R119, R109, Q12, Q14, Q13, Q15, Q18, Q21, Q11 ReTest Per TP 16238 3.3.8

24. QA REWORK: 107 25. QA RETEST: 107

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	NSR	PROBABLE DEFECT	ANALYSIS NO.
908806-3	Q11,13,15,17					
908809-1	Q21,12,14					

27. REWORK BY: H. Sanchez ORG: 22-14 DATE: 1-8-82 28. RETESTED BY: L Evans ORG: 2213 DATE: 29. ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: REFER TO IDC # PE 15:82 FROM L. O'CONNELL TO O.I. NAHANO. (COPY ATTACHED)

EO1327A WAS NOT INCORPORATED INTO AHR
L Evans 2/5/82 CLOSER REVIEW OF AHR READ.

31. ☐ CONTINUATION SHEET USED

33. FRB CLOSURE: 2/2/82

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: IDC # PE 15:82 (COPY ATTACHED)

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ TEST EQUIP. ☐ MFG. PROCEDURE ☐ WIRING ERROR ☐ UNKNOWN ☐ ENVIRONMENTAL ☐ TEST PROC. ☐ ASSY/FAB ERROR ☐ ROUGH HANDLING DEFECT CODE ☐ DEFECTIVE PARTS ☐ TEST SET-UP ☒ WORKMANSHIP ☐ WEAR-OUT

35. FAILURE TYPE: ☒ PRIMARY ☐ UNKNOWN ☐ INDUCED ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MINOR ☐ MAJOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: J.J. Banach ORG: 22-13 DATE: 1/27/82

38. SPACECRAFT SYSTEM ENGR: C. Lowry for J. Enyart ORG: SBRC DATE: 2/2/82

39. RELIABILITY: [signature] ORG: 57-41 DATE: 2/1/82

40. CUSTOMER OR SUPPLIER: G.A. DATE: 2/9/82

11873 SC JUL 78

SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company

INTERNAL MEMORANDUM

TO: O.I. Nakano

CC: D. Adams
L. Altman

DATE: 1 February 1982

REF: PE 15:82

SUBJECT: Failure Reports F2723, F2724 and S8051

FROM: L. O'Connell
51-41

BLDG. B-11 MAIL STA. 39
EXT. 6357

This is to confirm our Tel-Con of February 1,1982 regarding subject Failure Reports.

As I stated to you all three Failure Reports were written against the same printed wiring board (P/N 50916, S/N 201). The cause of the test failures in each case was the installation of an incorrect resistor.

Contract quantities of subject boards have been completed. However, to help you preclude reoccurrence of this type of discrepancy on future orders or current production, copies of subject Failure Reports are attached so you can discuss the problem with Responsible Manufacturing Supervision.

L. O'Connell, Manager
Administration and Reliability
Thematic Mapper Program

LO:jc

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SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 2724

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM PL1162 | 2. GLA: V411 | 3. MODEL: FLT | 4. TIME OBSERVED: 2:30 | 5. DATE OBSERVED: MO 1 DA 13 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☒ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD	Cal. Shutter Main	50916	201	SBRC
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMPERATURE ____ ° ____ AXIS FOR ____ MIN ☐ THERMAL VAC ____ HRS. AT ____ ° ____ TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: Phase offset unable To Adj. Properly. Visual inspection showed R24 To Be wrong Value is 30KΩ Should Be ~~50K~~ 10KΩ

15. TEST PROCEDURE: 16238 PARA 3.4.2.2 | 16. ORIGINATOR: L Crane | ORG 2213 | DATE 1/13/82 | ☐ 17. CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: No Stress To Components. Rework To print. Install 10KΩ For R24)

18. FAILED ITEM NAME AND PART NUMBER:

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Remove and replace R24 per Assembly drawing 50916 Retest per TP16238 PARA 3.4.2.2

21. AUTHORIZATION: L Crane / J R Bonach | ORG 2213 | DATE 1/13/82 | ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

22. REWORK/RETEST ACTION TAKEN: R24 removed and replaced replaced with Proper R24 Retested per TP16238 Para 3.4.2.2.

23a. QA REWORK: 107 1/14/82

23b. QA RETEST: 107

24. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.
	R24					

27. REWORK BY: M. Davis | ORG 22-74 | DATE 1-17-82 | 28. RETESTED BY: L Crane | ORG 2213 | DATE 1/14/82 | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: ~~REFER To FOC # PE 15182 FROM L. VECCHIO To O.E. (A. Ramos. COPY ATTACHED)~~ N/A - G.P. 3-16-82

OPERATOR AND QA ERROR. R24 SHOULD HAVE BEEN CHANGED PER AHP SUP'L. NO 4.

33. FRB CLOSURE: 2/2/82

☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: FOC # PE 15182 (COPY ATTACHED)

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP ☐ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: J R Bonach | ORG 22-13 | DATE 1/27/82

38. SPACECRAFT SYSTEM ENGR: [illegible] | ORG SBRC | DATE 2/2/82

39. RELIABILITY: [illegible] | ORG 51-41 | DATE 2/1/82

40. CUSTOMER OR SUPPLIER: [illegible] | DATE 2/16/82

11873 SC JUL 78

SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company

INTERNAL MEMORANDUM

TO: O.I. Nakano

CC: D. Adams
L. Altman

DATE: 1 February 1982

REP: PE 15:82

FROM: L. O'Connell
51-41

BLDG. B-11 MAIL STA.
EXT. 6357

SUBJECT: Failure Reports F2723, F2724 and S8051

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Contract quantities of subject boards have been completed. However, to help you preclude reoccurrence of this type of discrepancy on future orders or current production, copies of subject Failure Reports are attached so you can discuss the problem with Responsible Manufacturing Supervision.

L. O'Connell, Manager
Administration and Reliability
Thematic Mapper Program

LO:jc

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EL SEGUNDO, CALIFORNIA

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FAILURE REPORT

S 8049

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM PL 1162	V411	F1	7:37	MO 11 DA 6 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☒ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD	SLC PWB ASSY	52250-1	201	SBRC
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☒ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: Observed improper waveform during test. Upon examination of test set up found scope ground shorting to K3 pin 4.

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION ☐ SHEET USED
16520	4.2.2.6	L Evans	2213	11/6/81	

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: K3 Should Be Replaced, Good method OK (mm) U2 To be Replaced due To possible overstress
R14 (6.49K, 2W, 1% 5401B BD) TO BE REPLACED DUE TO POSSIBLE OVERSTRESS
REF: HS236-7718 STRESS ANALYSIS (ATTACHED)

19. FAILED ITEM NAME AND PART NUMBER: [illegible]

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Remove and replace U1, U2, K3, R14
NO COMPONENTS FAILED
Retest per TP 16520 Para 4.5.1

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION ☐ SHEET USED
J A Banach	22-13	11/6/81	

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Removed and replaced U1, U2, K3, R14
Retested to Test Procedure 16520 Para 4.5.1 (SEE ATTACHED DATA)

24. QA REWORK: 110

25. QA RETEST: 110

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
K3, 908311-5		7326K 33	752303	AMF Potter Brumfield	Possible overstress To Contacts	
U2 or 909 955-1					Possible overstress	
R14					POSSIBLE OVERSTRESS	

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION ☐ SHEET USED
M. Guerra	22-74	11/13/81	L. Evans	22-13	11/17/81	

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Incorrect Test setup.
Carefully insure test set up prior to initiation of test.
TECHNICIANS WERE CAUTIONED TO CHECK TEST-SET UP PRIOR TO TEST.
NO OTHER COMPONENTS OTHER THAN THE FOUR WERE FOUND TO BE OVERSTRESSED.

31. ☐ CONTINUATION SHEET USED

33. FRB CLOSURE: [signature] 11/18/81

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: HS236-7718 (COPY ATTACHED)

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☒ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
J A Banach	22-13	11/17/81	for L Evans	22-41	11/17/81

39. RELIABILITY	ORG	DATE	40. SUBCONTR OR SUPPLIER	DATE
[signature]	51-41	11/18/81	G.E.	

SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company

INTERNAL MEMORANDUM

5' 8049

TO: L. O'Connell

CC: Altman, L.
Banach, J.A.
Barnett, G.C.
Day, J.G.
Evans, L.B.
Wolthausen, L.H.
Data Bank

DATE: 12 November 1981

REF: HS236-7718
REAH 81/59

FROM: A. Huber

SUBJECT: FR: S8049 (Scan Line Corrector Board, Flight)

BLDG. B-11 MAIL STA. 102
EXT. 6246

FR: S8049, dated November 6, 1981

The failure occurred when performing optical/electrical calibration of the scan line corrector subassembly, with the scan line corrector board (assy. no. 52250-1, S/N 201) mounted in the SLC test box and receiving ±19V power (actually +21V) from a power supply within the test box. At the time of the failure two (2) oscilloscope probes were attached to test points at the top of the board and signals were being monitored on the oscilloscope display. The SLC motor and mirrors were in operation. With the occurrence of the failure the display went blank and SLC motor/mirror operation ceased. It was estimated that test equipment power was turned OFF within 15 seconds of the occurrence of the failure.

Investigation of the scan line corrector board found the ground lead of an oscilloscope probe in contact with the +19V on the SLC board, shorting the test equipment +19V power supply to signal ground and causing the +19V fuse (3 amp) to open. Figure 1 illustrates the point at which the short occurred (pin 4 of relay K3). Measurement of the resistances from (through) the SLC connector pins, to the input of relay K3, indicated nearly identical resistances for the '+19V' and '-19V' lines (0.061 ohms, connector pin 22 to relay pin 3; 0.058 ohms, connector pin 23 to relay pin 2). Measurement of the contact resistances of K3 indicated 0.013 ohms (pin 3 to pin 4) versus 0.010 ohms (pin 2 to pin 5). Subsequent testing of the board after the fuse was replaced (and before any components were replaced) revealed no change in board performance as a result of the failure.

Four components were eventually replaced: (1), relay K3; (2), voltage regulator U2; (3), voltage regulator U1; and (4), resistor R14 (6.49 ohms, 2w, 1%), appearing on motor driver assembly 54018, part of SLC board assembly 52250.

Relay K3 was replaced because of the possibility that the short circuit surge current from the 27,000 µfd power supply capacitor caused some degradation of the relay contacts.

Voltage regulator U2 (LM125) was replaced because of a possible overstress of Q12 within U2. This component, Q12, has a capability of approximately 30ma to 40ma (National Semiconductor, Tim Reagan, 408-737-5000 x 3887) and may have experienced a surge of 450 ma, depending upon the position of the SLC motor at the time of the failure. A second reason for replacement of this part was the possibility of excessive input voltage (greater than 30V) due to an inductive transient from the short circuit surge current. This latter possibility was also the reason for replacing the other LM125 voltage regulator, U1.

The resistor R14 (6.49 ohm, 1%) was replaced because in the presence of a short circuited +19V, the SLC motor driver produces a steady-state output as shown

5'80479

in Figure 2, resulting in a power dissipation of 2.5ω for R14. This component has a manufacturer's rating of 2ω.

All other components of the SLC board were analyzed for possible overstress. No other components (other than the four that were replaced) were found to have been possibly overstressed.

Andrew E. Huber
A. Huber

AH:jc

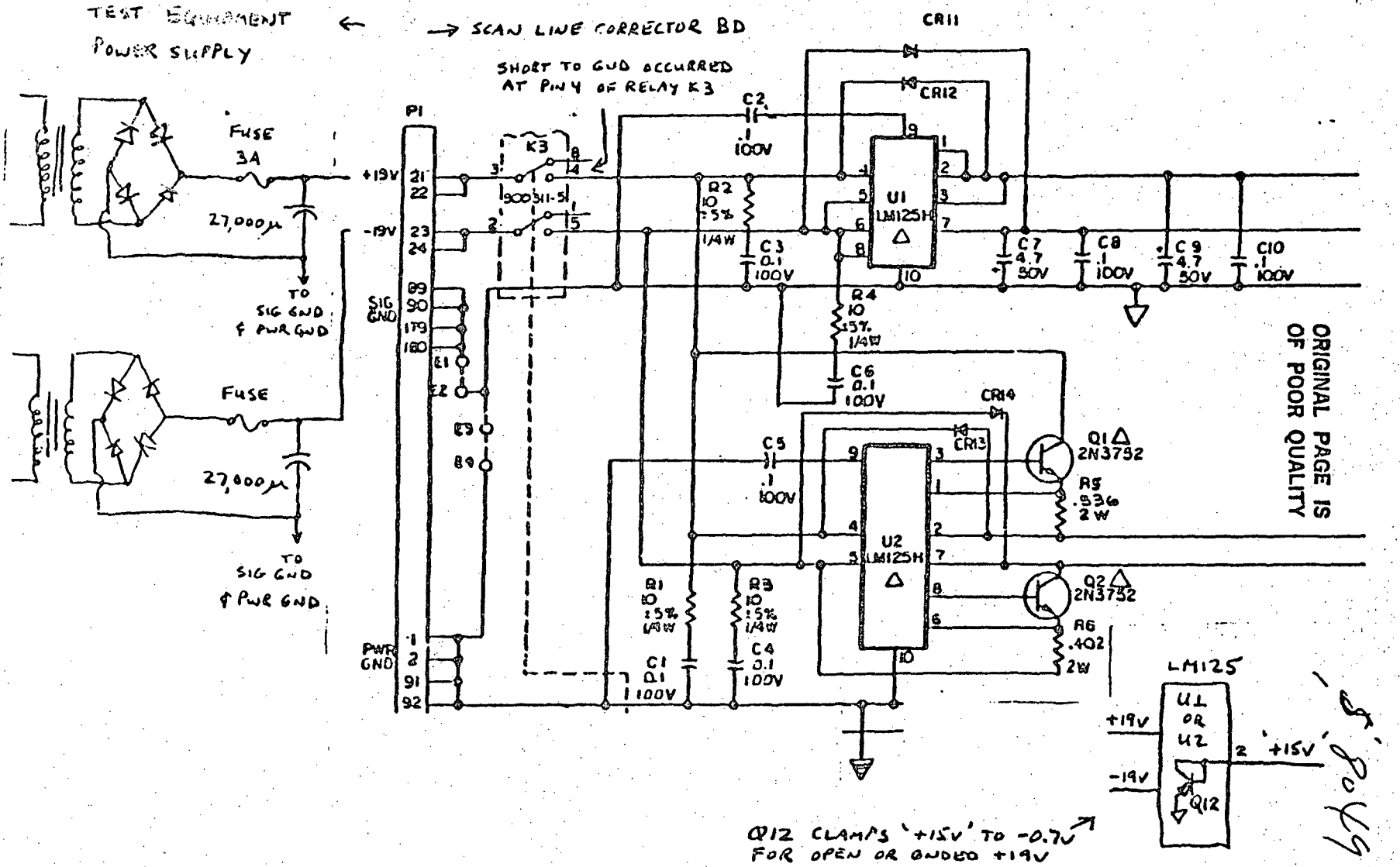

FIGURE 1. SLC ±19V POWER INPUT CIRCUITRY, ILLUSTRATING POINT AT WHICH FAILURE OCCURRED

5 8049

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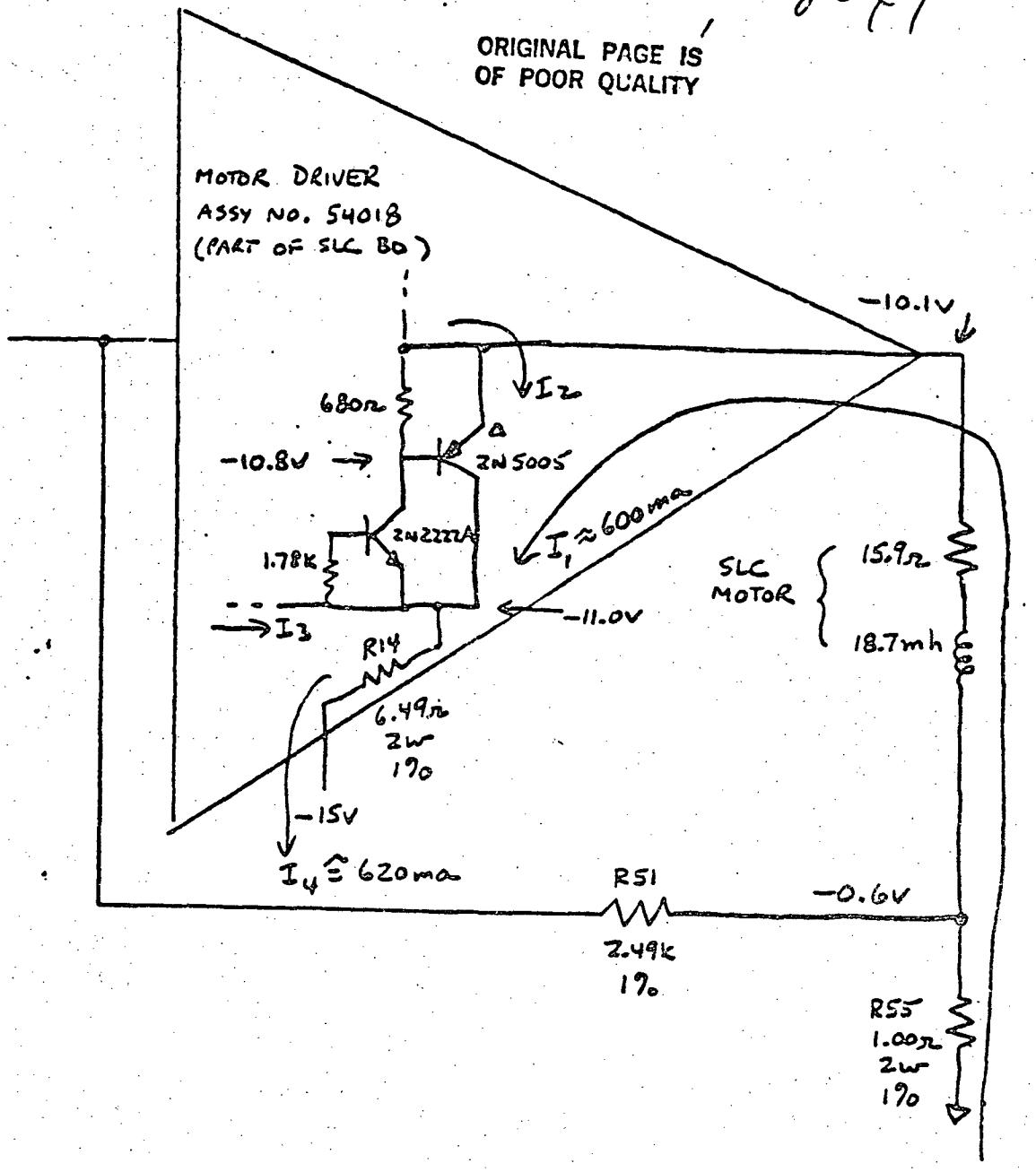

FIGURE 2. MOTOR DRIVER STEADY-STATE OUTPUT FOR +19V SHORT TO GND

5'8049
11/1-/81

4.5.1 Track Rate, Linearity, and Overlap/Underlap

FINAL LINEARITY DATA

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D. CYCLES 200

ET. NO. 1 ERROR FRACT.+ 5.41
OUNT MEAN 1128.92COUNT MAX 1130 COUNT MIN 1128 CNT STD DEV .2

ET. NO. 2 ERROR FRACT.+ 5.93
OUNT MEAN 1764.96COUNT MAX 1765 COUNT MIN 1764 CNT STD DEV .1

ET. NO. 3 ERROR FRACT.+ 5.16
OUNT MEAN 2485.04COUNT MAX 2486 COUNT MIN 2485 CNT STD DEV .1

ET. NO. 4 ERROR FRACT.+ 4.78
OUNT MEAN 3054.19COUNT MAX 3055 COUNT MIN 3054 CNT STD DEV .9

ET. NO. 5 ERROR FRACT.+ 4.38
OUNT MEAN 3700.84COUNT MAX 3701 COUNT MIN 3700 CNT STD DEV .3

ET. NO. 6 ERROR FRACT.+ 4.19
OUNT MEAN 4257.99COUNT MAX 4258 COUNT MIN 4257 CNT STD DEV 4.6

ET. NO. 7 ERROR FRACT.+ 3.92
OUNT MEAN 4882.04COUNT MAX 4883 COUNT MIN 4882 CNT STD DEV 4.9

ET. NO. 8 ERROR FRACT.+ 4.23
OUNT MEAN 5570.99COUNT MAX 5571 COUNT MIN 5570 CNT STD DEV .

ET. NO. 9 ERROR FRACT.+ 4.51
OUNT MEAN 6120.06COUNT MAX 6121 COUNT MIN 6120 CNT STD DEV .2

ET. NO. 10 ERROR FRACT.+ 5.15
OUNT MEAN 6759.24COUNT MAX 6760 COUNT MIN 6759 CNT STD DEV .4

5-8049

4.5.1 Track Rate, Linearity, and Overlap/Underlap

FINAL LINEARITY DATA

D. CYCLES 200

ET. NO.	1	ERROR FRACT.+	5.33					
OUNT MEAN	1128.08	COUNT MAX	1129	COUNT MIN	1128	CNT STD DEV		2
ET. NO.	2	ERROR FRACT.+	5.93					
OUNT MEAN	1765.00	COUNT MAX	1765	COUNT MIN	1765	CNT STD DEV		
ET. NO.	3	ERROR FRACT.+	5.17					
OUNT MEAN	2485.09	COUNT MAX	2486	COUNT MIN	2485	CNT STD DEV		3
ET. NO.	4	ERROR FRACT.+	4.77					
OUNT MEAN	3054.03	COUNT MAX	3055	COUNT MIN	3054	CNT STD DEV		
ET. NO.	5	ERROR FRACT.+	4.38					
OUNT MEAN	3700.84	COUNT MAX	3701	COUNT MIN	3700	CNT STD DEV		.
ET. NO.	6	ERROR FRACT.+	4.28					
OUNT MEAN	4258.95	COUNT MAX	4259	COUNT MIN	4258	CNT STD DEV		.
ET. NO.	7	ERROR FRACT.+	3.92					
OUNT MEAN	4882.04	COUNT MAX	4883	COUNT MIN	4882	CNT STD DEV		.
ET. NO.	8	ERROR FRACT.+	4.15					
OUNT MEAN	5570.04	COUNT MAX	5571	COUNT MIN	5570	CNT STD DEV		5.
ET. NO.	9	ERROR FRACT.+	4.59					
OUNT MEAN	6120.98	COUNT MAX	6121	COUNT MIN	6120	CNT STD DEV		5.
ET. NO.	10	ERROR FRACT.+	5.22					
OUNT MEAN	6759.97	COUNT MAX	6760	COUNT MIN	6759	CNT STD DEV		.

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FAILURE REPORT

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S 8050

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM PL1162
2. GLA: V411
3. MODEL: F1
4. TIME OBSERVED: 3:30
5. DATE OBSERVED: MO 11 DA 20 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD	SLC PWB Assy	52250-2	201	SBRC
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☒ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☒ TEMP 50 °C ☐ THERMAL VAC ____ HRS AT ____ °C AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: Observed improper linearity data over temperature per spec. 16123 as per Test Procedure 16520. Para 4.3

15. TEST PROCEDURE: 16520 | PARA: 4.3 | 16. ORIGINATOR: Lloyd Evans | ORG: 2213 | DATE: 11/24/81 | 17. CONTINUATION ☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Excessive Leakage current (500 @ +20°C; 100 @ +50°C through DG185AL (U13) switch contacts. -2V, +13.6V, -2V. U13. FAILURE CONFIRMED (FAR 9274)

19. FAILED ITEM NAME AND PART NUMBER: U13 JFET SWITCH 912922

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Remove and replace U13 (912922-1). Retest per TP 16520 Para 4.3

21. AUTHORIZATION: Evans / JA Brandt | ORG: 2213 | DATE: 11/25/81 | 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: REPLACED U13 PER AHR 52250-2, SUPPL 6 & TP16520, 4.3. REPLACED (RESELECTED) R32 TO 3.21K, 1% PER AHR 52250-2 OP. 3150 ON QA COMMENT SHEET & TP 16520, 4.2.2

24. QA RECORDS: 110

25. QA RETEST: 110

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
912922-1 SN 63347	U13	9Q249-5626	7913	SILICONIX		

27. REWORK BY: M. GUERRA | ORG: 22-74 | DATE: 11-30-81 | 28. RETESTED BY: L. EVANS | ORG: 22-13 | DATE: 12-7-81 | 29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: CAUSED BY FAILURE OF P/N 912922 FET SWITCH, CONFIRMED BY FAR 9274. THIS IS CONSIDERED A RANDOM FAILURE THAT COULD HAVE BEEN CAUSED IN ASSEMBLY OF THE FET SWITCH. NO CORRECTIVE ACTION IS DEEMED NECESSARY UNLESS A REPEAT OF THIS FAILURE MECHANISM IS SEEN, AND THE RANDOM HYPOTHESIS IS DISCARDED. THIS

31. FRB CLOSURE: ☒ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☒ ENVIRONMENTAL ☒ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: M.J. Janicke | ORG: 22-17 | DATE: 12-8-81 | 38. SPACECRAFT/SYSTEM ENGINEER: [signature] | ORG: 2241 | DATE: 3/9/82

39. RELIABILITY: [signature] | ORG: 5141 | DATE: 03-08-82 | 40. CUSTOMER OR SUPPLIER: AA | DATE: 3/15/82

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FAILURE REPORT
CONTINUATION SHEET

FR SERIAL NO. 2050

CONTINUATION SHEET LETTER

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN. DATE EACH ENTRY.

ADDITIONAL FR CONTINUATION SHEET(S) USED

30 WAS A VENDOR'S PROBLEM. HS 236-7891 ADVISED THE PART BOARD OF THIS PROBLEM.

SHEET 7

PART NO. 52250-2			PART NAME PWB Assy, Stand Line Corrector	ASSY/LOT SERIAL NO. 201	QTY 1
OPER NO.	DATE	OPERATOR OR INSP	COMMENTS, TEST DATA, ETC	DISPOSITION	APPROVAL
2101	11/18/81	[illegible]	U3 has wirebond that are lift.	P.R. Rework to B/R, Return with J. Antes	[illegible]
	11/18/81	[illegible]	[illegible] (F1)		
	11/18/81	[illegible]	replaced transistor		
2102	11/18/81	[illegible]	Clip lead broken back of small board.	P.R. Tester Remove & Return to Dept.	[illegible]
	11/18/81	[illegible]	removed clip lead		
3150	11/25/81	[illegible]	F/R 8050		
B	11-30-81		AS A RESULT OF REPLACING U13 PER ER 8050 SELECT RESISTORS R31 & R32 WILL REQUIRE RESELCTING AS FOLLOWS:		[illegible]
3101		22-724	1. UNSOLDER R31, TACK SOLDER 28 AWG		
	11-30-81	m. Hume	STANDOFF WIRES TO PADS & R31 TO WIRES.		
	11-30-81	m. Hume	2. UNSOLDER R32, TACK SOLDER 28 AWG STAND-		
			OFF WIRES TO PADS & R32 TO WIRES.		
3102		22-13	TEST PER 16520 REV A PARA 4.2.2 TO		
	11/30/81	[illegible]	RESELECT R31 & R32 ENTER ON TEST DATA SHEET		
3103	12-1-81	m. monty 22-72	KIT AND ENTER NEW SELECTS ON ABCTR FROM TEST DATA RECORDS		

8050

514-29-8

PART NO. 522502	PART NAME PWB ASSY SCAN LINE CORRECTOR	ASSY/LOT SERIAL NO. 201	QTY 1.

OPER NO.	DATE	OPERATOR OR, INSP	COMMENTS, TEST DATA, ETC	DISPOSITION	APPROVAL
3103	12/1/81	22-74	TACK SOLDER NEW RESISTORS TO STANDOFFS	R32 S/B 2.21K	
3104	12/1/81	22-13	TEST - VERIFY SELECTS	Replaced R32 w/ 2.21K	
3105		51-1 M. Queen	KIT INSPECT		
3106	12-4-81	22-74	INSTALL R31,R32 ON PWB PER B/P		
3107	4 Dec 81	51-1	INSPECT SOLDER		
3108	12/4/81	AF	MCE		
3109	12.7.81	22-72 m. mony.	RETURN ASSY TO TEST OPER 3150 SUP'L #1.		

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ASSEMBLY HISTORY RECORD SUPPLEMENT

SHEET 1 OF 4

PART NUMBER	SERIAL OR LOT NUMBER	DRAWING NO	DRAWING REVISION	QA SOURCE CODE	PREPARED BY	SUPPLEMENT NO. 6 TO AHR DATED 23 June 80
52250-2	201	52250	C	22-71	G.W.Cannon	
ASSEMBLY NAME: PWB ASSEMBLY SCAN LINE CORRECTOR			APPLICABLE ID.	RESP ENG. APPROVAL	QUALITY APPROVAL	SUPPLEMENT RELEASE DATE 25 Nov. 81
PURPOSE OF SUPPLEMENT - INCORPORATES NEW ASSY DWG REVISION [ ] OR EOST [ ]; REWORK [ ]; OTHER [X]. EXPLAIN: FR S 8050				PRODUCTION APPROVAL	PROJ ENG APPROVAL	NOTE TO PRODUCTION - UPON RECEIPT, ENTER SUPPLEMENT NO. AND RECEIPT DATE ON FRONT SHEET OF AHR. INITIAL THE ENTRY.
				DATE 11/25/81	OTHER	

NOTES: SAME AS ORIGINAL

OPER NO.	S/C NO.	INSTRUCTIONS	PERFORMED BY: OPER	INSP	DATE	REMARKS
		REASON; Improper linearity data over temperature test.				
		PURPOSE: Perform test at 0°C and 50°C for voltage verification.				
		NOTIFY QA AND AF PRIOR TO TEST				Notified 11/25/81
3105	22-13	1) Perform and record the following at 50°C	L Evans		11/25/81	
		with 108KHZ out and TP14 at +13V measure and record the following voltages;	↓		↓	

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SHRC

ASSEMBLY HISTORY RECORD CONTINUATION SHEET

SHEET 2 OF 4

PART NUMBER	SERIAL OR LOT NUMBER	ASSEMBLY NAME	CONTINUATION OF:
52250-2	201	PWB ASSEMBLY SCAN LINE CORRECTOR	AHR DATED AHR SUPPLEMENT NO. 6

OPER NO:	S/C NO.	INSTRUCTIONS	PERFORMED BY OPER	PERFORMED BY INSP	PERFORMED BY DATE	REMARKS
3105	Cor..	Junction of R31 and R32 -2.7430 V	[illegible]		11/21/81	
		Junction of R32 and R33 -2.5246 V				
		2) Repeat with 108KHZ out and TP14 at -2V--Record.				
		Junction of R31 and R32 -2.6[illegible] V				
		Junction of R32 and R33 -2.0065 V				
		3) Test at 0°C with 108KHZ out and TP14 at +13V--				
		Record.				
		Junction of R31 and R32 -2.[illegible] V				
		Junction of R32 and R33 -2.0[illegible] V				
		4) Repeat with 108KHZ out and TP14 at -2V--Record.				
		Junction of R31 and R32 -2.6520 V				
		Junction of R32 and R33 -2.0075 V				
		Record change of parts as determined by above test.				
		REPLACE: U13				

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1 of 4 P050

SHRC

ASSEMBLY HISTORY RECORD CONTINUATION SHEET

SHEET 3 OF 4

PART NUMBER	SERIAL OR LOT NUMBER	ASSEMBLY NAME	CONTINUATION OF:
52250-2	201	PWB ASSEMBLY SCAN LINE CORRECTOR	AHR DATED AHR SUPPLEMENT NO. 6

OPER NO.	S/C NO.	INSTRUCTIONS	PERFORMED BY OPER	PERFORMED BY INSP	PERFORMED BY DATE	REMARKS
3110	22-72	Kit and enter on ABC/TR the following:	DI Mondy		11-25-81	
		1 EA 912922-1 1C U13 ITEM 25				
3115	51-11	Kit inspect.		T 17	11/25/81	
3120	22-74	Carefully remove the following part U13, bag, tag	[illegible]		11-25-81	
		and forward to Q.A.				
		[illegible] U13 per B/P.	[illegible]		11/25/81	

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5, 050

SMC

ASSEMBLY HISTORY RECORD CONTINUATION SHEET

SHEET 4 OF 4

PART NUMBER	SERIAL OR LOT NUMBER	ASSEMBLY NAME	CONTINUATION OF:
52250-2	201	PWB ASSEMBLY SCAN LINE CORRECTOR	AHR DATED AHR SUPPLEMENT NO. 6

OPER NO:	S/C NO.	INSTRUCTIONS	PERFORMED BY OPER	PERFORMED BY INSP	PERFORMED BY DATE	REMARKS
3125	51-11	Inspect Operation 3120. Forward 413 to re-		(illegible 200)	11/25/91	
		liability via QST/NCMR.				
3126	AF	MCI		(illegible)	11/30/91	
3130	22-71	Return to AHR Supplement 1, Operation 3150.				

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S'P05'

SBRC REQUEST FOR SHIPMENT 9249

THIS REQUEST MUST BE FILLED OUT COMPLETELY IN ACCORDANCE WITH THE INSTRUCTIONS ON THE REVERSE SIDE HEREOF

SHIPPING CANNOT PROCESS INCOMPLETE REQUESTS

DATE: 12-21-81

P TO:
Hughes
El Segundo
Space Communication Div
Bldg S-41 Rm 1103C
1650 E Imperial Hwy
RK FOR: Elsegundo, CA 90245
A NO.:

• SHIPMENT REQUIRED AT DESTINATION BY: 12-23-81

• THIS SHIPMENT IS AGAINST REQUIREMENTS OF:
W. A. NO. / ACCT. NO.: [redacted] V410-6403
GOV'T CONT NO.: NAS5-24800
CUSTOMER P. O.: 59011
SBRC P. O. / P. A.: 59011

• SHIPMENT TO BE: PREPAID ☐ COLLECT ☐

SHIPMENT CLASSIFICATION

CONTRACT OR P. O. SHIPMENT IS:
PARTIAL ☐
FINAL ☑
HAZARDOUS MAT'L ☐
NON-HAZARDOUS ☑

• SECURITY CLASSIFICATION:
UNCLASSIFIED ☑
CONFIDENTIAL ☐
SECRET ☐
REF SEC'Y PRACTICES NOs 11-2-1, 11-2-14

• PROPERTY OWNERSHIP:
COMPANY ☑
IDENTIFIED ☐
GOVERNMENT ☐
DD 1149 ☐
CUSTOMER OR SUPPLIER ☐

• TYPE OF SHIPMEI
RTV
OUTSIDE PROCE
SALE
MISCELLANEOUS

P.O. PA / CONTR EA. NO.	QUANTITY THIS SHPMT	UNIT	ON ORD	BACK ORD'D	SBRC P/N	ITEM(S) DESCRIPTION	DC V
	1	EA			90994-1	Shift Register	50
	1	EA			912922-1	I.C.	

To be shipped for Failure Analysis

SPECIAL SHIPPING, MARKING INSTRUCTIONS: Please place on SBRC Shuttle

SHIPMENT REQUESTED BY: Jennifer Bldg 812 M/C 24 DATE: 12/21/81

APPROVED BY:

HUGHES

REQUEST FOR INSPECTION/TEST

(SEE REVERSE SIDE FOR COMPLETION INSTRUCTION)

No. 300833

1. DATE OF REQUEST: _____

2. TO: J.P. PERSH DEPT. NO. 44-07 BLDG. 5-41 RM. 1076 MS B255 EXT. 648 8358

3. FROM: L. O'CONNELL DEPT. NO. 51-41 BLDG. 11 RM. E-215 MS 39 EXT. 968-6293

4. AUTHORIZED SIGNATURE: L. O'Connell

5. Project/Program: TRIDENT MISSILE

6. GL A/Acct No. _____

7. P.O. No. _____

8. R.R. No. _____

9. Stock Xfr. No. _____

10. Credit Req. No. _____

11. Work Order No. _____

12. NCMR No. 412457

13. Other _____

14. INSTRUCTIONS:
PLEASE ARRANGE FOR FAILURE ANALYSIS OF P/N 91922-1. PART WAS REMOVED FROM P/N 52250-2 S/N 201. REFERENCE FAILURE REPORT 5th POSO. (COPY ATTACHED)

15. ITEM	16. QTY	17. PART NUMBER	18. ACC	19. SUSP	20. DATE	21. INSP. STAMP/ ENG'R SIGNATURE	22. HOURS CHARGED	23. COMMENTS–SPECIFY REASONS FOR NON–ACCEPTANCE
1	1	91922-1						

5th POSO

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HUGHES
HUGHES AIRCRAFT COMPANY
TECHNOLOGY SUPPORT DIVISION

FAILURE ANALYSIS REPORT

FAR No. 9274
Program: Thematic Ma

DATE OF RECEIPT 1-11-82	TSD PROJECT ENGINEER W. Gettys
REQUESTER H. Persh/F. Carle	PHONE 6458194 BLDG./MS STD/C340
ORG. 44-07 PHONE 6488388 BLDG./MS S41/B355	GLA/CMER 40930 (F263A2151)
REA Lionel Altman PHONE	

COMPONENT I.C. (1)	FAILURE REFERENCE FR S8050/FA82-006
FUNCTION/TYPE FET Switch	DATE OF FAILURE 11-20-81
GENERIC P/N DG185AL	FAILURE LEVEL Card
HUGHES P/N 912922	LOT NUMBER 9C249-5026
MFG. Siliconix P/N SD8531	CIRCUIT SYMBOL U13
DATE CODE 7913 S/N G3347	MODULE 52250-2 S/N 201

ABSTRACT

The reported failure, high "off" state leakage, was confirmed. Internal examination revealed a crack across the die which contained the driving circuitry for the defective output switch. It is believed that the leakage was due to this crack. This failure is judged to have been primary.

TECHNICAL COMMENTARY
☐ NOT REQUIRED
☒ APPENDED

C. A. Edelman	L1153-121	P. G. Backes	2/5/82
FAILURE ANALYST	JOURNAL	APPROVAL	DATE

Reported Failure:

High "off" state leakage of 5uA @ 20°C, increasing to 10uA @ 50°C on pins 1 and 2 only.

Background Information:

The above failure was observed while testing per procedure 16520 para. 4.3. The subject device, which was U13 on the SLC PWB, assembly 52250-2 S/N 201, was replaced. No additional testing of the device was performed prior to its submittal for failure analysis.

Outline of Anlaysis:

1. External Visual Examination
2. Electrical Tests
3. Hermeticity Testing
4. Particle Impact Noise Detection (PIND) Testing
5. Internal Examination
6. Electrical Probing

Results of Analysis:

1. External Visual Examination.

   a) Markings: G3347 (on attached label)
   SDG8531
   (Siliconix logo) 7913

   b) Case Examination:

   The leads were crimped, slightly bent and solder coated. There was adhesive tape on the bottom surface. No other obvious visual physical anomalies were noted.

2. Electrical Testing.

   a) Curve Tracer Measurements:

   Current-voltage characteristics were obtained for each pin to V+ (pin 6) and to V- (pin 9), in both polarities. Pins 1 and 2 were degraded to both V+ and V- as compared to other JFET output pins. No other obvious defects were indicated. See Figures 1 and 2 for pin connection and schematic diagrams.

   b) Functional and Parametric Tests:

   The device was functionally tested with V+ = 15V, V- = -15V, V_L = 5V, V_R = 0V, V_{IL} = 0.8V and V_{IH} = 2.0V. With no current flow across the JFET, source and drain voltages were measured. All outputs remained at 0V regardless of the input state except pins 1 and 2 (S4 and D4), which floated at -14.72V to -14.77V for input states 0 and 1, respectively.

   The device was tested per 912922 for $r_{DS(on)}$, $I_{S(off)}$, I_{IN}, I_+, I_-, I_L and I_R. All data were within the specified limits except $I_{S(off)}$ of pin 1 (gate 4), which was 33.4uA but should be 1.0nA maximum. The data are summarized as follows:

(continued)

Results of Analysis: (continued)

2. Electrical Testing. (continued)

b) Functional and Parametric Tests: (continued)

PARAMETER	GATE 1	GATE 2	GATE 3	GATE 4	LIMIT
$r_{DS(on)}$	34.5Ω	34.0Ω	30.9Ω	30.6Ω	75Ω max.
$I_{S(off)1}$	0.109nA	0.133nA	0.079nA	*33.4μA	1.0nA ma
$I_{D(off)1}$	0.051nA	0.070nA	0.035nA	0.030nA	1.0nA ma
I_{INL}	-13.3μA				-250μA m
I_{INH}	0.152nA				10nA max
I^{+}_{1}	8.0nA				0.1mA ma
I^{-}_{1}	1.68mA				-4.0mA m
I_{L1}	2.57mA				4.5mA ma
I_{R1}	-0.88mA				-2.0mA m
I^{+}_{2}	0.86mA				3.0mA ma
I^{-}_{2}	-2.54mA				-5.5mA m
I_{L2}	2.54mA				4.5mA ma
I_{R2}	-0.85mA				-2.0mA m

* Out of tolerance.

c) Baking and Additional Testing.

The device was baked for 2 hours at +150°C and retested for $I_{S(off)1}$. $I_{S(off)1}$ of gate 4 was 38.1uA compared to 33.4μA before baking. The other gates did not change significantly in $I_{S(off)1}$.

3. Hermeticity Testing.

The device passed the fine leak test and the gross leak characterization.

4. Particle Impact Noise Detection (PIND) Testing.

No indications of loose internal particles were noted during PIND testing.

5. Internal Examination.

Internal examination revealed a crack in the die containing the driver circuitry. The crack extended across the source and channel regions of MOSFET Q5 and terminated at the scribe surface. The crack also passed under the metallization leading from the source of Q5 to the output JFET, Q6. The above mentioned defects pertain only to gate 4. (See Figures 3 through 5.)

6. Electrical Probing.

The JFET between pins 1 and 2 was isolated from the driver chip by lifting the source and gate leads. The JFET was then tested for source-gate and drain-gate characteristics and was not found to be degraded.

5-2050

Conclusions:

The reported failure, high "off" state leakage, was confirmed. Excessive leakage current ($I_{S(off)}$) was observed through pins 1 and 2 at ambient temperature. Pins 1 and 2 were also observed to float near V- while the other switch outputs were at ground. No other electrical defects were indicated. Baking did not elicit significant change in $I_{S(off)}$ of pins 1 and 2. Internal examination revealed a crack across the die containing the driving circuitry. This crack passed through the MOSFET leading to the source and gate of the JFET switch across pins 1 and 2. It is believed that the high leakage was due to the crack since the JFET switch was not found to be defective. This failure is judged to have been primary.

58050

Pin Number	Designation
1	S4
2	D4
3	D2
4	S2
5	IN 2
6	V^+
7	V_L
8	V_R
9	V^-
10	IN 1
11	S1
12	D1
13	D3
14	S3

Figure No. 1

Pin connection table for the 912922.

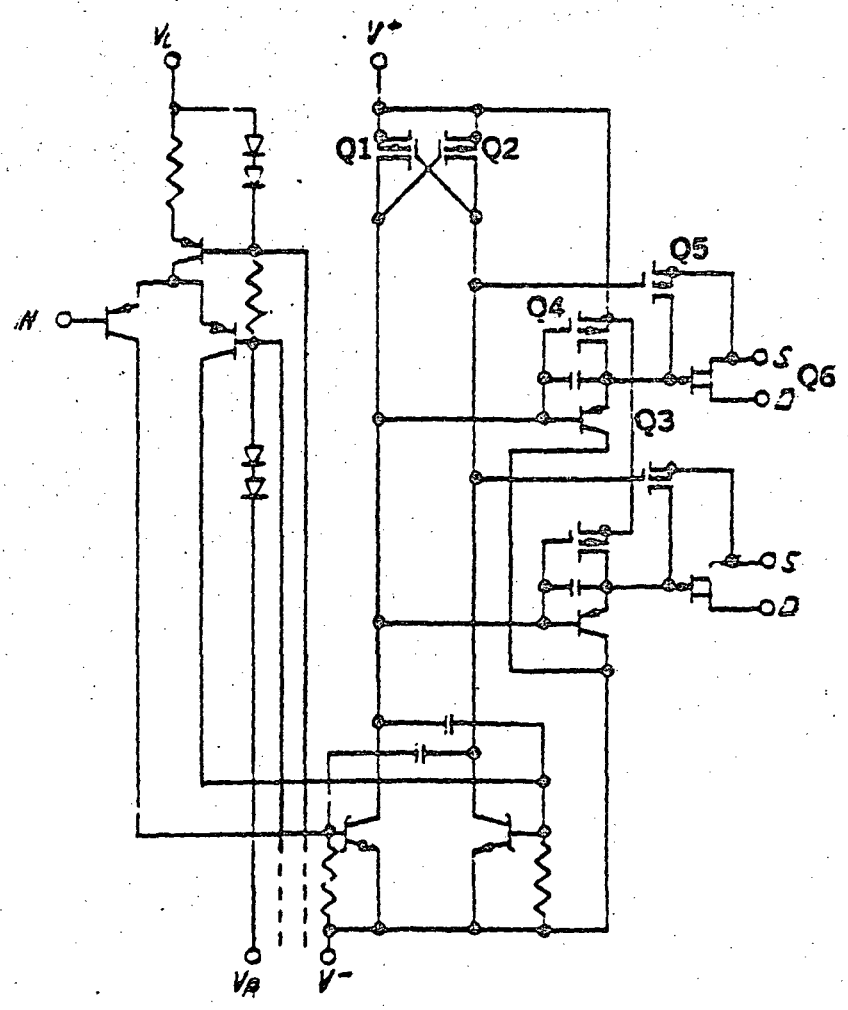

Figure No. 2

Schematic diagram for a typical inp channel with two DPST JFET switche

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DIVISION

ENGINEERING TECHNICAL COMMENTARY

COMMENTARY

The device was tested and found to have failed the reported failed parameter, IS(off). The spec limit was 1.0nA max. and the device measured 33.4 A. This high leakage was probably due to the crack discovered in the die during the internal visual examination. The crack was probably caused by poor handling techniques during assembly.

RECOMMENDATIONS:

Device is considered a random failure. If other devices from this lot are available, a few devices should be temperature cycled to determine if other devices may have this same sort of defect.

ENGINEER	ENGINEERING APPROVAL	DATE
John Vasquette		2-20-92

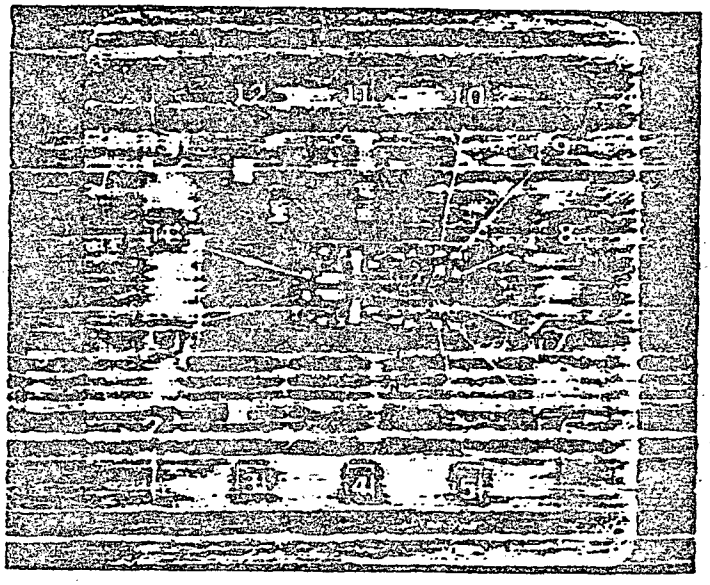

Figure No. 3

Photomicrograph of the cavity showing the driver circuitry (center die) and the four JFET switches on separate substrates.

(13.7X)

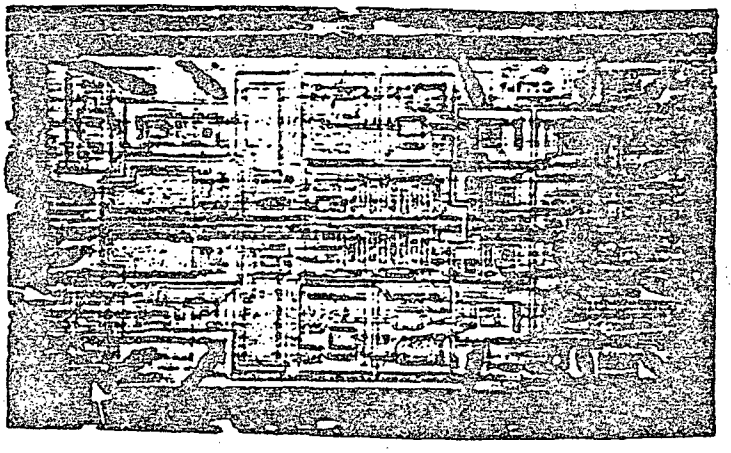

Figure No. 4

Overall view of the center die showing the location of the crack shown in Figure 5 (between arrows).

(46.2X)

5'2050

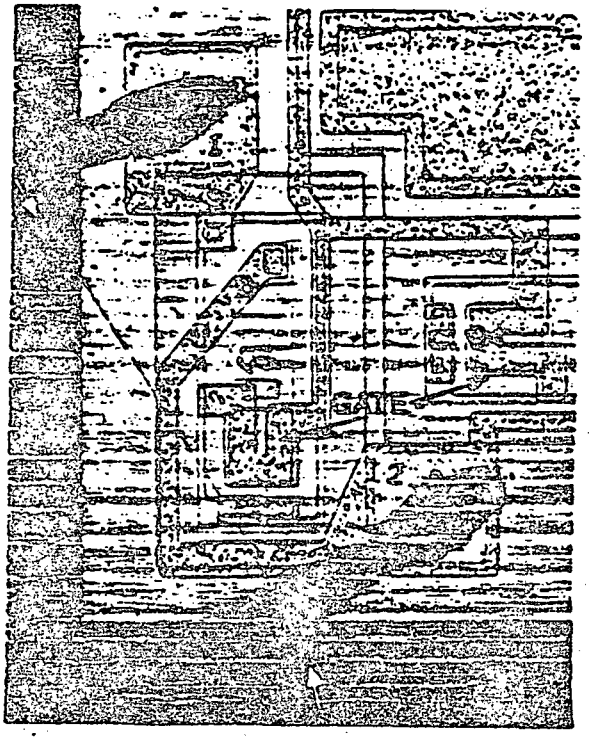

Figure No. 5. Detailed view of the crack across MOSFET Q5 of the driver circuitry. Note that the crack extends to the scribe surface at the edge of the die (between arrows). (182X)

SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company

INTERNAL MEMORANDUM

5'2050

TO: Frank Carle
Parts Board

CC: See Distribution List

DATE: 15 March 1982

REF: HS 236-7891
PE 55:82

FROM: L. O'Connell

SUBJECT: Failure of P/N 912922

BLDG. B-11 MAIL STA. 39
EXT. 6357

1. On 20 November 1981 a failure was observed in the TM Scan Line Corrector. This failure was repaired by the replacement of P/N 912922.

2. TSD FAR 9274 declares that the failure may be due to possible mishandling during the manufacturing process.

3. This unit was procured from Siliconix. Please take any necessary action to advise the manufacturer and to preclude the repetition of this type of failure.

L. O'Connell, Manager
Administration and Reliability
Thematic Mapper Program

LOC:jc

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EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

S 8051

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM PL 1162	V 411	FLT	4:22	MO 1 DA 11 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☒ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD	Col Shutter Main	50916	201	SBRC
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: Phase Ramp; unable To Adjust correctly. Found R87 incorrect Value. Should be 169 kΩ is 442 kΩ.

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION
16238	3.3.7	L Evans	2213	1/11/82	☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: R87 incorrect Value Should be 169 kΩ is 442 kΩ
No Stress To components

19. FAILED ITEM NAME AND PART NUMBER

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Replace R87 per Assembly drawing 50916
Retest per T.P 16238 3.3.7

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION
L Evans	2213	1/11/82	☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: R87 Removed and Replaced

24. QA REWORK: 1/12/82 107

25. QA RETEST: 107

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
	R87					

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION
P Prather	22-74	1-12-82	L Evans	2213	1/12/82	☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: REFER TO IDC #PE 15:82 FROM L. O'CONNELL TO O.I. NAKANO. (COPY ATTACHED)
EO1557A WAS INCORPORATED FULLY INTO AHR. CLOSER REVIEW OF AHR REQ'D.
L Evans 2/8/82

31. FAB CLOSURE: 2/2/82

31. CONTINUATION ☐ SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: IDC #PE 15:82 (COPY ATTACHED)

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☒ MFG. PROCEDURE ☒ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE — 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
D Branch	22-13	1/27/82	L Evans (for) Engel	SBRC	2/2/82

39. DEPARTMENT MGR	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
L Evans	51-41	2/1/82	N.A.	

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2/9/82

SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company

INTERNAL MEMORANDUM

TO: O.I. Nakano

CC: D. Adams
L. Altman

DATE: 1 February 1982

REF: PE 15:82

FROM: L. O'Connell
51-41

BLDG. B-11 MAIL STA. 39
EXT. 6357

SUBJECT: Failure Reports F2723, F2724 and S8051

This is to confirm our Tel-Con of February 1,1982 regarding subject Failure Reports.

As I stated to you all three Failure Reports were written against the same printed wiring board (P/N 50916, S/N 201). The cause of the test failures in each case was the installation of an incorrect resistor.

Contract quantities of subject boards have been completed. However, to help you preclude reoccurrence of this type of discrepancy on future orders or current production, copies of subject Failure Reports are attached so you can discuss the problem with Responsible Manufacturing Supervision.

L. O'Connell, Manager
Administration and Reliability
Thematic Mapper Program

LO:jc

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FAILURE REPORT

S 8107

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM PL 1162		FLT	0845	MO 3 DA 30 YR 8

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☒ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7 SUBSYSTEM	Electronic Module	52347	003	
8. UNIT	51402	51402		
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☐ CARD				
11 OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☒ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: J24 Pin 5 and 6 +/- 20V Return reads .66 ohms to chassis ground. It should be 10 meg ohm min. ~~d24 pin 11 thru 813, 829 thru 33 read too low (approx. 86k should be 10 M Ω min.) thru~~

FR 8112

15. TEST PROCEDURE: TP 39015-531 | PARA | 16. ORIGINATOR: R.C. Buckley | ORG 2242 | DATE 3-30-82 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: U3 mounting screw was shorting heat sink to board ground. Above 1mA w/(AB) board in. Reads (Pin 11) 124 k w/ AB out (Meter + to chassis) same 1.07 M Ω (Meter + to Pin 11)

19. FAILED ITEM NAME AND PART NUMBER: None

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Correct fault by re-mounting U3 and assuring that sleeving correctly insulates the screw from contact with anything but the U3 case.

21. AUTHORIZATION: Current | ORG 22-17 | DATE 3/31/82 | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Repositioned and U3 and reinstalled hardware/new sleeving on screws.

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY: J.P. Duncan | ORG 1274 | DATE 3/31/82 | 28. RETESTED BY | ORG | DATE | 29. ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: MOUNTING OF TO-3 DEVICES WAS NOT STANDARDIZED. THIS LED TO MOUNTING WITH SLEEVING OF WRONG LENGTH AND SCREWS OF DIFFERENT DIAMETERS. THIS FAILURE WAS APPARENTLY A MISASSEMBLY PROBLEM. ECA 2722/01 WRITTEN AT END OF CONTRACT SHOULD PREVENT SIMILAR PROBLEMS IN ANY FUTURE FABRICATION

31. ☒ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: ECA 2722 ED. C

33. FAB CLOSURE: [signature] 5/11/82

34. BASIC CAUSE OF VERIFIED FAILURE: ☒ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR/OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
Current	22-17	5/11/82	[signature]	22-41	5/11/82
39. RELIABILITY: [signature]	ORG 5141	DATE 5-11-82	40. CUSTOMER OR SUPPLIER		DATE

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HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

FAILURE REPORT
CONTINUATION SHEET 58107

58107
CONTINUATION SHEET LETTER* A

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

ADDITIONAL FR CONTINUATION SHEET(S) USED ☐

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN. DATE EACH ENTRY.

30	NOTE: SLEEVING WAS CRUSHED DUE TO MISALIGNMENT BETWEEN BOARD AND U3. STANDARDIZED MOUNTING (ECA 2722/01) WILL CORRECT PROBLEM — QP

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FAILURE REPORT

S 810

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM PL 1162		FLT	1000	MO 3 DA 30 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☒ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM	Electronics Module	52347	003	
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☒ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ☐ THERMAL VAC ____ HRS AT ____ ° ☐ AXIS FOR ____ MIN TYPE ____ ☐ OTHER ____

14. DESCRIPTION OF FAILURE: J24-C1, C4, P4, P5, 01, 3 GE wires are connected to pins 8 & 9 of J24 socket. Pins 11, 12, 29, 30, 31, and 32 should be 3.5K ohms & should read 10 meg ohms min. These are on J24 and seem to be related to the AR board failure on PR 8107

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION SHEET USED
TP 32015-531	5.1.1.3	RC Buckley	2246	3-7-82	☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: N/A - ITEM 14 IDENTIFIED WRONG PINS - TO BE RE-WRITTEN (INCORRECT PIN #'S IN 14)

19. FAILED ITEM NAME AND PART NUMBER:

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: See 18

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: N/A

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUM

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION SHEET USED
						☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: THIS DISCREPANCY WAS TRANSFERRED TO S 811 BECAUSE OF ERROR NOTED IN ITEM 18 -

31. CONTINUATION SHEET USED ☐

33. FAILURE CLOSURE: [signature] 4/27/82

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE N/A: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE N/A: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE — 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	22-17	4/6/82	[signature]	2241	4/12/82

39. RELIABILITY	ORG	DATE	CUSTOMER OR SUPPLIER	DATE
[signature]	51-41	4-9-82	[signature]	

0118-3 SC JAN 80

5/7/82

HUGHES

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EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

S 8112

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM PL1162		FLT	1000	MO 3 DA 30 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☒ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME TM	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM	Electronics Module	52347	003	
8. UNIT	NOTE: Cancels & Supersedes FR 8108 which has wrong 124 pin nos.			
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☒ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: J24 Pins 1, 12, 29, 30, 31, 32 read 86.35K ohms to chassis ground and should read > 10 meg ohms. Seemed related to A8 board fault in FR 8107. A8 board was in place for above readings.

15. TEST PROCEDURE: WD 32815-531 | PARA: 5.1.1.3 | 16. ORIGINATOR: Roy C Buckley | ORG: 2242 | DATE: 3-31-82 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: When the A8 and A7 board shorts were repaired these readings returned to normal. A8, 514Ω; A7, 513Ω8

19. FAILED ITEM NAME AND PART NUMBER:

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: Already done on FR's 8107 & 8368 -

21. AUTHORIZATION | ORG | DATE | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: N/A

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
N/A						

27. REWORK BY: N/A | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: CAUSE UNKNOWN SECOND TORN, TAPE WITH SOLDER. See 20 - For S/N 8368 A KAPTON TAPE INSULATOR WAS INSTALLED BETWEEN U28 AND PWB. THERE WAS NO DETERMINATION OF CAUSE OF TEAR IN INSULATION. (POSSIBLE DEFECTIVE MATERIAL) FOR S/N 107 A MISALIGNMENT BETWEEN U3 AND PWB CAUSED THE

31. ☒ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: ECA 2220 EOC

33. FRB CLOSURE

34. BASIC CAUSE OR VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☒ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	M-17	4/6/82	[signature]	2241	5/11/82
39. RELIABILITY [signature]	ORG 5141	DATE 4-26-82	RELIABILITY OR SUPPLIER [signature]		DATE 5/4/82

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FAILURE REPORT
CONTINUATION SHEET

FR SERIAL NO. S-8112
CONTINUATION SHEET LETTER* A

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

ADDITIONAL FR CONTINUATION SHEET(S) USED ☐

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN. DATE EACH ENTRY.

30	SLEEVING TO BE CRUSHED. ECA 2722 (END OF CONTRACT) WILL STANDARDIZE THIS MOUNTING AND PREVENT FUTURE OCCURENCE OF SIMILAR DISCREPANCIES. QP

S8127

SBRC ENGINEERING CHANGE REQUEST

SHEET 1 OF 1

NO. TM27221/01

DRAWING TITLE	DRAWING NUMBER	REV
PWB ASSY, TELEMETRY SCALING - FUSELINK - LAMP SEQUENCER	51402	D

CLASS CHANGE	DRAWING TYPE	PRIORITY OF CHANGE	PL NO.	WORK AUTHORIZATION NO.
I ☐ II ☒ A	A ☐ B ☒	emergency ☐ urgent ☐ routine ☒	PL 1162	V415-67-30

OTHER AFFECTED ENGINEERING DOCUMENTS

SEE ECA

REASON CHANGE NEEDED (EXPLAIN IN FULL)

U3 MOUNTING SCREW WAS SHORTING HEATSINK TO PWB GROUND (REF: FR S8107)

NATURE OF PROBLEM AND/OR REQUIRED CHANGE

STANDARDIZE MOUNTING OF TO-3 CONFIGURED DEVICES & ICs.

REQUESTED BY	DATE	APPROVAL	DATE
R. Thurston	5/5/10	Clement	5/10/82
CM/DE REVIEWER	DATE	APPROVAL	DATE
Johnson	5/5/82	[illegible]	5-11-82
EFFECTIVITY EOC 51065 SN 004 & SUBS		APPROVAL	DATE
		[illegible]	5-11-82
ITEM DISPOSITION		APPROVAL	DATE
		[illegible]	5/11/82
		APPROVAL	DATE
		[illegible]	5/12/82
		APPROVAL	DATE
		[illegible]	5/27/82

REWORK ☐ ITEMS CONFORM ☐
NO ITEMS MADE ☐ REJECT ☐
USE ☒ NOT APPLICABLE ☐

VELLUM ISSUE APPROVED BY

ACTION TAKEN

ECO. _____ DWG. REV. ___

INCORP. BY	DATE	HRS REQ

CHECKED BY	DATE	HRS REQ

SE 4C FORM NO. 367-D (NOV 80)

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58112

SBRC

ENGINEERING CHANGE ANALYSIS

SHEET 1 OF 2

PROJECT/SYSTEM: THEMATIC MAPPER (TM)

ECR/ECP NO.: TM272/01 | REV.: D

PL 1162

WA V 415-67-30

TITLE OF CHANGE: STANDARDIZATION OF MOUNTING TO-3 CONFIGURED DEVICES & ICs.

CLASS CHANGE: ☐ I ☒ IIA ☐ IIB

CONTROL ITEM

RESIDENT REQUIRED: YES ☐ NO ☐

NAME: ELECTRONIC MODULE

CONTROL ITEM CHANGE EFFECTIVITY: 51065 SN 004 & EOC SUBQ

ECAE REQUIRED: YES ☐ NO ☐

MAEC REQUIRED: YES ☐ NO ☐

RETROFIT REQUIRED: YES ☐ NO ☒

PROCUREMENT/MANUFACTURING DOCUMENTS AFFECTED:
- ☒ PURCHASE ORDER
- ☒ MATERIAL REQ
- ☒ AHRS
- ☒ MFG PLANNING
- ☐ OTHER _____
- ☒ ABCTR
- ☐ SUPPLIER PLANNING

HARDWARE/SOFTWARE AFFECTED:
- ☒ CONTROL ITEM
- ☐ TOOLING
- COMPUTER PROGRAMS: ☐ SYSTEM ☐ TEST
- ☐ TEST EQUIPMENT
- ☐ GFE

RELATED FACTORS AFFECTED:
- ☐ INSPECTABILITY
- ☒ PERFORMANCE
- ☐ TESTABILITY
- ☐ INTERFACE
- ☐ INTERCHANGEABILITY
- ☐ WEIGHT/MASS PROPERTIES
- ☐ EMI
- ☒ RELIABILITY
- ☒ MATERIALS & PROCESSES
- ☐ SAFETY
- ☐ MAINTAINABILITY
- ☐ OPERATING INSTALLATION
- ☒ COST/SCHEDULE-SEE ECAE/MAEC
- ☒ PRODUCIBILITY
- ☐ CONTRACT DATA ITEMS

HARDWARE DISPOSITION: SEE ECAE ☐ SEE MAEC ☐

IN HOUSE		AT SUPPLIER	
☐ REWORK	☐ ITEMS CONFORM	☐ REWORK	☐ ITEMS CONFORM
☐ NO ITEMS MADE	☐ REJECT	☐ NO ITEMS MADE	☐ REJECT
☒ USE	☐ NOT APPLICABLE	☐ USE	☐ NOT APPLICABLE

REMARKS

NEED TO STANDARDIZE THE MOUNTING OF TO-3 DEVICES & ICs TO USE SAME MOUNTING HOLE CLEARANCE HOLES, MOUNTING HARDWARE AND INSULATORS ON ALL PWBs.

SPECIFICATIONS AND ENGINEERING DRAWINGS AFFECTED

DOCUMENT NUMBER	DOCUMENT REV.	DOCUMENT EO NO.	SUBCONTROL ITEM ASSEMBLY NO.	SUBCONTROL ITEM CHANGE EFFECTIVITY
52250			52250-1 52250-2	
52252			52252	
50926			50926	
50928			50928	
50916			50916	SEE CONTINUATION SHEET

CRB APPROVAL	DATE	CUSTOMER APPROVAL/CONCURRENCE	DATE

SB 7000 JAN 81

38112

~~ECA~~ CONTINUATION SHEET

SBRC
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☐ ECR ☒ ECA ☐ ECAE

NO.	REV	SH NO.
		2

ALL INFORMATION ENTERED HEREON SHALL BE IDENTIFIED BY THE APPROPRIATE BLOCK HEADING FROM THE ECR, ECA, OR

ENGINEERING DRAWINGS/
ASSEMBLIES AFFECTED (CONTD)

50918
51398
51400
51402
51404
53877
53878
50900
50902
50948
50950
51813
51815
52797
52799

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FAILURE REPORT

S 8125

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM PL 1162 | 2. CLA: | 3. MODEL: FLT | 4. TIME OBSERVED: 1700 | 5. DATE OBSERVED: MO 4 DA 6 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☒ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MCAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM	Electronic Module	52347	003	
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MCAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☒ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ☐ THERMAL VAC ____ HRS AT ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: J35 Pin 22 (signal ground Bond 1 ch 10) open

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION ☐ SHEET USED
TP 32415-531	5.3.2.5	Roy C Buckley	2242	4/6/82	

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Traced fault to loosely mounted wear saver. Tightened wear saver and problem was solved.

19. FAILED ITEM NAME AND PART NUMBER: N/A

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: See 18

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION ☐ SHEET USED
—			

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: N/A

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
N/A						

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Test setup was not properly mated through wear saver. In future, torque wear saver screws better. Test technicians have been alerted to check mating of connectors more thoroughly.

31. CONTINUATION ☐ SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

33. FRB CLOSURE: J. Alderman 4-9-82

34. BASIC CAUSE OF VERIFIED FAILURE									
	☐ DESIGN	☐ TEST EQUIPMENT	☐ MFG. PROCEDURE	☐ WIRING ERROR	☐ UNKNOWN	DEFECT CODE
	☐ ENVIRONMENTAL	☐ TEST PROCEDURE	☐ ASSY/FAB ERROR	☐ ROUGH HANDLING		
	☐ DEFECTIVE PARTS	☐ TEST SET-UP	☐ WORKMANSHIP	☐ WEAR-OUT		

35. FAILURE TYPE			36. FAILURE CLASSIFICATION		
☐ PRIMARY	☐ UNKNOWN		☐ CRITICAL	☐ MINOR	
☒ INDUCED	☐ NO FAILURE		☐ MAJOR	☐ SAFETY	

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
Cynthia	22-17	4/8/82	[signature]	2241	4/9/82

39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
[signature]	51-41	4-8-82	[signature] 4/9/82	

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FAILURE REPORT

S 8126

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM PL 1162		FLT	1730	MO 4 DA 6 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☒ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM	Electronics Module	57347	003	
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☒ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RR ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: J30 PIN 49 A (Signal ground Band 1 Ch 15) open

15. TEST PROCEDURE: TP 32015-531 | PARA: 6.3.2.3 | 16. ORIGINATOR: Roger C Buckley | ORG: 2242 | DATE: 4/7/82 | 17. CONTINUATION ☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Traced fault to loosely mounted wear saver. Tightened wear saver and problem was solved.

19. FAILED ITEM NAME AND PART NUMBER: N/A

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: See 18

21. AUTHORIZATION | ORG | DATE | 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: N/A

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
N/A						

27. REWORK BY: | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: TEST SETUP WAS POORLY MATED THRU WEAR SAVER. In future torque wear saver screws better. TEST TECHNICIANS HAVE BEEN ALERTED TO CHECK MATING OF CONNECTORS MORE THOROUGHLY.

31. FAB CLOSURE: [signature] 4-9-82

31. CONTINUATION ☐ SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☒ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
Current	22-17	4/8/82	[signature]	2291	4/9/82
39. RELIABILITY: [signature]	ORG: 51-41	DATE: 4-8-82	40. CUSTOMER OR SUPPLIER: [signature]		DATE: 4/9/82

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FAILURE REPORT

S 8139

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM AL 1162		FLT	10P	MO 5 DA 8 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☒ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☒ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD		50942 (A4)	202	
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CONTROL TEMP VOLTAGE OUT OF SPEC.
IN P446, READING WAS +3.885, S/B 3.0 ± 0.1
IN P447, READING WAS +3.876, S/B 4.0 ± 0.1

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION SHEET USED
6235 4.4.6, 4.4.7		SLONAKER	2213	5-10-82	☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS

19. FAILED ITEM NAME AND PART NUMBER: TEMP CONTROL BD 50942

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: SPEC WILL BE CHANGED PER EO 4366A TO EXTEND ACCEPTABLE RANGE

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION SHEET USED
Slonaker	22-13	5-10-82	☐

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: EO 4366A ISSUED.

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION SHEET USED
						☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: VOLTAGE TOLERANCES IN SPEC. WERE TOO TIGHT.
EO 4366A CHANGES TOLERANCES SO THAT PREVIOUS ~~CHANGE~~ READINGS ARE NOW WITHIN SPEC.
(COPY ATTACHED)

31. CONTINUATION SHEET USED ☐

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: EO 4366A EFFECTIVITY 5/13 ~~5/20~~

33. FRB CLOSURE: [signature] 5/21/82

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☒ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	22-17	5/21/82	[signature] for I Engel	5SRC	5/21/82

39. RELIABILITY	ORG	DATE	CUSTOMER OR SUPPLIER	DATE
[signature]	51-41	5-24-82	N.A.	

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5/21/82

MAIN AHR-OP#600 - STEP 2
REF NCMR 393234

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FAILURE REPORT

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S 8283

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM V011 PL1162
2. GLA:
3. MODEL: FLIGHT
4. TIME OBSERVED: DAY SHIFT
5. DATE OBSERVED: MO 8 DA 20 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	BAND 2 POST AMP	30904-2	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☒ TEMP 15° C ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CHANNEL 13 FAILED TO MEET PRE-GAIN RESISTOR (RST) SELECTION REQUIREMENTS WITHOUT USING AN OUT-OF-RANGE COMPONENT. LIMITS: 4.12K TO 11.8K; VALUE: 3.83K

15. TEST PROCEDURE: 16597 PARA 4.5
16. ORIGINATOR: A.C. DAVISON II ORG 2213 DATE 8-25-81
17. CONTINUATION ☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: SITUATION VERIFIED AT TEST; SELECTION STEP. NO PARTS OVERSTRESSED THROUGH THE USE OF THIS PART VALUE.
19. FAILED ITEM NAME AND PART NUMBER: PREGAIN RESISTOR (RST)
20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: OBVIOUSLY AN OUT-OF-RANGE VALUE IS REQUIRED TO MEET GAIN SPECIFICATIONS.
21. VERIFICATION: A.C. Davison II ORG 2213 DATE 8/26/81
22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: NONE
24. QA REWORK
25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
N/A						

27. REWORK BY: N/A ORG ____ DATE ____
28. RETESTED BY: N/A ORG ____ DATE ____
29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: RANGE SPECIFIED IN 16597 NOT BROAD ENOUGH TO PROVIDE ADJUSTMENT. E.O. TO SPEC REQUIRED.
RANGE WAS: 4.12K TO 11.8K
CHANGE TO: 3.01K TO 11.8K
31. CONTINUATION ☐ SHEET USED
31. FAB CLOSURE: 10/22/81
32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: E.O. 3442A - EFFECTIVITY S/N 203 & SUBS.

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☒ TEST PROCEDURE ☐ TEST SET-UP ☐ TEST EQUIPMENT ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN
DEFECT CODE:
35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE
36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE
A.C. Davison II	2213	8/26/81

38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[illegible]	2261	811022

RELIABILITY	ORG	DATE
[illegible]	51-41	10/20/81

39. CUSTOMER OR SUPPLIER:	DATE
[illegible]	10/26/81

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HUGHES

HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP
FAILURE REPORT

S 8309

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
THEMATIC MAPPER HS 236		FLT	11 AM	MO 10 DA 28 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7 SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	VERIFICATION REGISTER UNIT	50948	201	
10. ☐ MODULE ☐ MICAM ☐ CARD				
11 OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ____ ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: SOLDER BRIDGE BETWEEN TRACES TO U31 PIN 7 AND U31 PIN 8

15. TEST PROCEDURE: 16422 | PARA: 5.1 | 16. ORIGINATOR: J. GUYTON | ORG: 22-13 | DATE: 10-28-81 | 17. CONTINUATION ☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: U31 PIN 7 SHORT TO GND CAUSED NO WORD G PRIMARY OUTPUT. SHORT OBSERVED AND SHOULD BE REMOVED. NO FAILURE TO U31 PIN 7 OUTPUT AS RESULT OF WORKMANSHIP ERROR. REFER TO HS 236-7701 FOR STRESS ANALYSIS (COPY ATTACHED)

19. FAILED ITEM NAME AND PART NUMBER

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: REMOVE SOLDER BRIDGE BETWEEN U31 PIN 7 AND U31 PIN 8. RETEST PER 16422 PARA 5.1

21. AUTHORIZATION: J. GUYTON | ORG: 22-13 | DATE: 10-28-81 | 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: REMOVED SOLDER BRIDGE BETWEEN TRACES TO U31 PIN 7 AND U31 PIN 8. RETESTED PER 16422 PARA 5.1 WORD G PRIMARY OUTPUT IS CORRECT.

24. QA REWORK: BLT 8

25. QA RETEST: BLT 8

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY: L. TORRES | ORG: 22-74 | DATE: 10-28-81

28. RETESTED BY: J. GUYTON | ORG: 22-13 | DATE: 10-30-81

29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: POOR WORKMANSHIP CAUSED SOLDER SPLASH. CLOSER SUBSEQUENT VISUAL INSPECTIONS CAN OBSERVE PROBLEM. A MEET WAS HELD WITH MFG AND QA INSPECTION AND REVIEWED THE ABOVE PROBLEM, AND THIS SIMILAR PROBLEM FUTURE OCCURRENCES. 11-3-81

31. CONTINUATION ☐ SHEET USED

31. FRB CLOSURE: 11/3/81

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: A. Bonach | ORG: 22-13 | DATE: 10-30-81

38. SPACECRAFT SYSTEM ENGINEER | ORG: 72-61 | DATE: 11/3/81

39. RELIABILITY | ORG: 51-41 | DATE: 11-3-81

CUSTOMER QA SUPPLIER | DATE

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SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT 1430

S 8310

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
THEMATIC MAPPER HS 236		F-LT	2:30 PM	MO 10 DA 28 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☒ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	ELECTRONICS MODULE			
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	CAL AMP/INCHWORM DRIVER	50926	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROCESS ☒ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ ☐ EMC/RFI ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: TS 16234 PARA 3.3.2.2 NO -12V OUTPUT

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION ☐ SHEET USED
TS 16234	3.3.2	K Russ		10-28-81	

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: AR 6 OPERATIONAL AMPLIFIER INSTALLED UPSIDE DOWN (CLOCKED BACKWARD)
AR 6 OVERSTRESSED - NO OTHER PARTS OVERSTRESSED QP 2-9-82
+12V AND -12V POWER TO AR 6 WERE INTERCHANGED. THIS WOULD CAUSE THE OPAMP TO

19. FAILED ITEM NAME AND PART NUMBER: AR 6

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: REMOVE AND REPLACE AR6
RETEST PER PARA 3.3.2.2

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION ☒ SHEET USED
J A Bonnah	22-13	10/30/81	

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: AR6 REMOVED AND REPLACED.

24. TRAVELER 172

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
	AR6					

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION ☐ SHEET USED
M GUERRA	22-74	10/30/81	E. L. Antes	22-13	1-8-82	

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: WORKMANSHIP ERROR. ASSEMBLY TECHNICIAN HAS BEEN CAUTIONED TO REVIEW ORIENTATION OF DEVICE PRIOR TO SOLDERING.
QP 2-9-82

31. ☐ CONTINUATION SHEET USED

33. FAB CLOSURE: 2/11/82

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☒ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
J B Rogerly	22-13	1-4-82	E E Mead	22-41	2/11/82

39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
D. D.	F111	2-9-82		

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SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT
CONTINUATION SHEET

FR SERIAL NO. S 8310
CONTINUATION SHEET LETTER* A

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON
IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN, DATE EACH ENTRY.

ADDITIONAL FR CONTINUATION SHEET(S) USED ☐

18	FAIL, HOWEVER NO OUT OF SPEC SIGNAL WAS SENT TO ANY FOLLOW-ON CIRCUITRY AS THE LM 108 IS USED AS A +13.5 V TO -13.5 V SOURCE. THE MAX SEEN IN THIS INSTANCE COULD HAVE BEEN BETWEEN + AND MINUS 12 V. CP-2-16-82

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FAILURE REPORT

S 8311

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
THEMATIC MAPPER HS236		FLT	11:00	MO 10 DA 29 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	SCR BUFFER REC/DET	50900	202	
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☒ TEMP 50 °C ☐ THERMAL VAC ____ HRS AT ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: TEST FOR TIR RECORDS 5 FAILURES IN 2(10⁶) CYCLES AT 50°C

15. TEST PROCEDURE 16389 PARA 5.4 | 16. ORIGINATOR J GUYTON ORG 22-13 DATE 10/29/81 | 17. CONTINUATION ☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: SHIFT REGISTER U17 909940-1 (54L165) OUTPUT AT HI TEMP (50°C) APPEARS TO SHIFT INCORRECTLY AS DOCUMENTED IN ATTACHED TEST DATA RECORD

19. FAILED ITEM NAME AND PART NUMBER: SHIFT REGISTER (U17) 909940-1

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: REMOVE AND REPLACE U17 (909940-1) RERUN 16389 ALSO PERFORM PENALTY TEST STR FOOL (COPY ATTACHED)

21. AUTHORIZATION J A Banach | ORG 22-13 | DATE 10-30-81 | 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: U17 REPLACED · STR FOOL SUCCESSFULLY COMPLETE 1HR 55°C. TEST SPEC 16389 PARA 5.1 RERAN. INITIALLY FAILED AT 50°C AFTER ONE HOUR TESTING (2x10⁶ CYCLES) SUBSEQUENT TESTS AT 50°C FOR > ONE HOUR AS SPECIFIED ON 5 NOV AND 6 NOV 1981 PASSED WITHOUT FAILURE.

24. QA REWORK 1 110

25. QA RETEST 1 110

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
909940-1	U17					

27. REWORK BY H SANCHEZ | ORG 22-74 | DATE 11/2 | 28. RETESTED BY J GUYTON | ORG 22-73 | DATE 11/5 11/6 | 29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: REFER TO HS 236-7714 (COPY ATTACHED) 11/10/81
DEFECTIVE U-17 PROBABLE
KARE TEMP FAILURE SHOULD BE CHECKED AT
INCOMING SCREENING

31. ☐ CONTINUATION SHEET USED

33. FRB CLOSURE 11/11/81

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: REFER TO HS 236-7714 (COPY ATTACHED)

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☒ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☒ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
J A Banach	22-13	11/10/81		22 61	11/11/81
39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER		DATE
	31-41	11/12/81			

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SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company

INTERNAL MEMORANDUM

TO: Distribution CC:

DATE: November 9, 1981
REF: HS 236-7714
FROM: J. A. Banach
BLDG. B12 MAIL STA. 58
EXT. 6203

SUBJECT: 22-13 Supplemental Information for Failure Report S8311

Description of the Function of the Serial Magnitude Board (P/N 50900).

The function of subject board is to receive serial data and process it as Discrete Digital TTL Commands; in addition, the card echoes back as telemetry serial input commands.

Description of Problem.

At high temperature (+50°c) following approximately one (1) hour of operation (> 1,000,000 cycles) the primary side experienced failures on two (2) separate occassions (consecutive days). Following replacement of U17 the same failure occurred once.

Failure Description

The echo telemetry did not meet specification, although the output commands were always correct. NOTE: Is condition - data sent was 5555. Command data outputted from board was 5555. Confirmed telemetry data received was AB55. Should be condition - Telemetry data received should be 5555. (refer to attached data sheet.)

Rational For Not Replacing Additional Components or Taking Additional Corrective Action.

Subsequently on two following days (including in excess of four (4) hours of additional high temperature testing) the failure mode could not be duplicated. (Engineering estimate of test cycles is > 10,000,000 cycles).

Engineering judgement concludes that further removal and replacement of components in a selected fashion would still be speculative and not worth the risk to board damage.

The board's telemetry is read in real time, such that this failure observation is unlikely to occur. (NOTE: Output commands are always observed to be correct in our testing of subject board.)

Additional corrective actions are not planned at this time.

J. A. Banach
J. A. Banach
Head, Circuit Design, System Integration
Thematic Mapper Program

Concurrence
L. O'Connell
Reliability Manager
Thematic Mapper Program

MONITOR

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T12
TEST PROGRAM NO. 12 - - - - - > SERIAL MAGNITUDE CMD AUTO DATA TEST -
                                SENDS ALTERNATING BIT PATTERN TO CMC R.D.
                                READS TELEMETRY & ACTUAL OUTPUT FOR VERF.

ENTER OPERATOR DATA. YES OR NO ? Y

ASSY. NO.: ------ 50900
CARD NAME: ------ SERIAL MAG CMD REC/DEC
SERIAL NO.: ----- 202
DATE & TIME: ---- 29 OCT '81
PRI. OR RDT.: --- PRI
TEST OPERATOR: -- J GUYTON
OTHER TEST
CONDITIONS: ----- OPERATIONAL TEMPERATURE 50 DEGREES C.


TO START TEST EXECUTION
PRESS "G" KEY.

(TO TERMINATE TEST PRESS "ESC" KEY.)
G

RUN WITH CONSTANT DELAY. YES OR NO ? YESS
PRINT VERIFICATION ERRORS. YES OR NO ? YES

50 DEGREES C  REACHED AT 10:15

 DATA SENT WAS 5555 TELEMETRY IS AB55 ACTUAL OUTPUT IS 5555
 DATA SENT WAS 5555 TELEMETRY IS AB55 ACTUAL OUTPUT IS 5555
 DATA SENT WAS 5555 TELEMETRY IS AB55 ACTUAL OUTPUT IS 5555
 DATA SENT WAS 5555 TELEMETRY IS AB55 ACTUAL OUTPUT IS 5555
 DATA SENT WAS 5555 TELEMETRY IS AB55 ACTUAL OUTPUT IS 5555

CURRENT CYCLE COUNT IS : 0002,079,500

CURRENT ERROR COUNT IS : 0000000005

 - - TESTING COMPLETED - -

DATE & TIME: ---- 29 OCT '81   11:15
PRI. OR RDT.: --- PRI
TEST OPERATOR: -- J GUYTON
OTHER TEST
CONDITIONS: ----- PRIMARY SIDE DATA CYCLING AT 50 DEGREES C
                  TERMINATED AT 11:15

MONITOR
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See FIR 8311

FIR 8311
J Guyton
29 OCT '81

TEST DATA RECORD SHEET

Assembly 50900 (PWB A10)

Step	Ref. Spec. Paragraph	Measurement	Observed Value	Requirement
1.	5.1.6.3	U1-emitter voltage	+4.97	+5.0 ±0.2 vdc
2.	5.1.7.1	PRI current, nominal line	87.6 mA	≤0.30 amperes
3.	5.1.7.2	PRI current, low line	86.0 mA	Nominal Value ±10%
4.	5.1.7.3	PRI current, high line	87.7 mA	Nominal Value ±10%
5.	5.1.8.2	U21-emitter voltage	+5.10	+5.0 ±0.2 vdc
6.	5.1.9.1	RDT, current, nominal line	91.8 mA	≤0.30 amperes
7.	5.1.9.2	RDT current, low line	90.0 mA	Nominal Value ±10%
8.	5.1.9.3	RDT current, high line	91.9 mA	Nominal Value ±10%

9. At the conclusion of testing, verify that all appropriate entries have been made on the terminal printout either from the terminal or in long hand by the test operator. 6 NOV '81

10. Verify that the original of the terminal printout has been reproduced for the purpose of maintaining a permanent record. (The thermal paper used by the terminals deteriorates with time.)

11. Signatures:

Test Engineer [signature] Date 11-6-81

Design Engineer _____ Date _____

Quality Assurance [signature] Date 11-6-81

RETEST FOR F/B 8311 AFTER U17 REPLACEMENT

SIZE	CODE IDENT NO	NUMBER
A	11323	16389

SCALE | REV E | SHEET 21

S8311

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```
T12
TEST PROGRAM NO. 12 - - - - > SERIAL MAGNITUDE CMD AUTO DATA TEST -
                              SENDS ALTERNATING BIT PATTERN TO SMC R/D, AN
                              READS TELEMETRY & ACTUAL OUTPUT FOR VERF.


ENTER OPERATOR DATA, YES OR NO ! Y

ASSY. NO.: ------ 50900
CARD NAME: ------ SER MAG CMD REC/DEC  (A10)
SERIAL NO.: ----- 202
DATE & TIME: ---- 5 NOV '81
PRI. OR RDT.: --- PRI
TEST OPERATOR: -- J GUYTON
OTHER TEST
CONDITIONS: ----- OPERATIONAL TEMP 50 DEGREES C AT 10:44
                  (PRI)

TO START TEST EXECUTION
PRESS "G" KEY.

(TO TERMINATE TEST PRESS "ESC" KEY.)
G

RUN WITH CONSTANT DELAY, YES OR NO ! Y
PRINT VERIFICATION ERRORS, YES OR NO ! Y


CURRENT CYCLE COUNT IS : 0001858252

CURRENT ERROR COUNT IS : 0000000000

 - - TESTING COMPLETED - -

DATE & TIME: ---- 5 NOV '81   11:44
PRI. OR RDT.: --- PRI
TEST OPERATOR: -- J GUYTON  J Guyton 5 Nov '81
OTHER TEST
CONDITIONS: ----- TERMINATE DATA CYCLING AT 50 DEGREES C (PRI)
```

Retest
F/R 8311

58311

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MONITOR

T12
TEST PROGRAM NO. 12 - - - - - > SERIAL MAGNITUDE CMD AUTO DATA TEST -
                                SENDS ALTERNATING BIT PATTERN TO IMC R/D, AN
                                READS TELEMETRY & ACTUAL OUTPUT FOR VERF.


ENTER OPERATOR DATA, YES OR NO ! YES

ASSY. NO.: ------ 50900
CARD NAME: ------ SER MAG CMD REC / DEC
SERIAL NO.: ----- 202
DATE & TIME: ---- 5 NOV '81      11:55
PRI. OR RDT.: --- RDT
TEST OPERATOR: -- J GUYTON
OTHER TEST
CONDITIONS: ----- OPERATIONAL TEMP (50 DEGREES C) REACHED AT 11:55


TO START TEST EXECUTION
PRESS "G" KEY.

(TO TERMINATE TEST PRESS "ESC" KEY.)
G

RUN WITH CONSTANT DELAY, YES OR NO ! Y
PRINT VERIFICATION ERRORS, YES OR NO ! Y


CURRENT CYCLE COUNT IS : 0001910341

CURRENT ERROR COUNT IS : 0000000000

 - - TESTING COMPLETED - -

DATE & TIME: ---- 5 NOV '81      12:56
PRI. OR RDT.: --- RDT
TEST OPERATOR: -- J GUYTON  J Guyton 5 NOV '81
OTHER TEST
CONDITIONS: ----- TERMINATE REDUNDANT DATA CYCLING AT 50 DEGREES C.
                  AT 12:56.
```

Retest
F/R 8311

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58311

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MONITOR



T12
TEST PROGRAM NO. 12 - - - - > SERIAL MAGNITUDE CMD AUTO DATA TEST -
                              SENDS ALTERNATING BIT PATTERN TO SMC R/D, AND
                              READS TELEMETRY & ACTUAL OUTPUT FOR VERF.


ENTER OPERATOR DATA, YES OR NO ! Y

ASSY. NO.: ------ 50900
CARD NAME: ------ SER MAG CMD REC/DEC  (A10)
SERIAL NO.: ----- 202
DATE & TIME: ----
PRI. OR RDT.: --- RDT   5 NOV '81   13:07
TEST OPERATOR: -- J GUYTON
OTHER TEST
CONDITIONS: ----- OPERATIONAL TEMPERATURE  0 DEGREES C.


TO START TEST EXECUTION
PRESS "G" KEY.

(TO TERMINATE TEST PRESS "ESC" KEY.)
G

RUN WITH CONSTANT DELAY, YES OR NO ! Y
PRINT VERIFICATION ERRORS, YES OR NO ! Y

0 DEGREES C. REACHED AT  13:14.


CURRENT CYCLE COUNT IS : 0002075128

CURRENT ERROR COUNT IS : 0003000000

 - - TESTING COMPLETED - -

DATE & TIME: ---- 5 NOV '81   14:14
PRI. OR RDT.: --- RDT
TEST OPERATOR: -- J GUYTON  J Guyton 5 NOV 81
OTHER TEST
CONDITIONS: ----- RDT SIDE DATA CYCLING AT 0 DEGREES C
                  TERMINATED AT 14:14

MONITOR
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Retest
F/L 8311

58311

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T12
TEST PROGRAM NO. 12 - - - - - > SERIAL MAGNITUDE CMD AUTO DATA TEST -
                                SENDS ALTERNATING BIT PATTERN TO SMC P/D. AND
                                READS TELEMETRY & ACTUAL OUTPUT FOR VERF.


ENTER OPERATOR DATA. YES OR NO ! Y

ASSY. NO.: ------ 50900
CARD NAME: ------ SER MAG CMD REC/DEC
SERIAL NO.: ----- 202
DATE & TIME: ---- 5 NOV '81   14:19
PRI. OR RDT.: --- PRI
TEST OPERATOR: -- J GUYTON
OTHER TEST
CONDITIONS: ----- PRI SIDE DATA CYCLING AT 0 DEGREES C
                  BUGUN AT 14:21

TO START TEST EXECUTION
PRESS "G" KEY.

(TO TERMINATE TEST PRESS "ESC" KEY.)
G

RUN WITH CONSTANT DELAY. YES OR NO ! Y
PRINT VERIFICATION ERRORS. YES OR NO ! Y


CURRENT CYCLE COUNT IS : 0001839075

CURRENT ERROR COUNT IS : 0000000000

 - - TESTING COMPLETED - -

DATE & TIME: ---- 5 NOV '81   15:21
PRI. OR RDT.: --- PRI
TEST OPERATOR: -- J GUYTON  J Guyton 5 Nov '81
OTHER TEST
CONDITIONS: ----- PRIMARY SIDE 0 DEGREES DATA CYCLING
                  TERMINATED AT 15:21.


MONITOR
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Retest
F/R 2-1-0

S8311

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MONITOR

T12
TEST PROGRAM NO. 12 - - -    > SERIAL MAGNITUDE CMD AUTO DATA TEST -
                               SENDS ALTERNATING BIT PATTERN TO SMC R/D.
                               READS TELEMETRY & ACTUAL OUTPUT FOR VERF.


ENTER OPERATOR DATA. YES OR NO ! YES

ASSY. NO.: ------ 50900
CARD NAME: ------ SER MAG CMD REC/DEC  (A10)
SERIAL NO.: ----- 202
DATE & TIME: ---- 5 NOV '81   16:22
PRI. OR RDT.: --- PRI
TEST OPERATOR: -- J GUYTON
OTHER TEST
CONDITIONS: ----- PRI SIDE COLD START UP AT -25 DEGREESC.


TO START TEST EXECUTION
PRESS "G" KEY.

(TO TERMINATE TEST PRESS "ESC" KEY.)
G

RUN WITH CONSTANT DELAY. YES OR NO ! Y
PRINT VERIFICATION ERRORS. YES OR NO ! Y


CURRENT CYCLE COUNT IS : 0000045438

CURRENT ERROR COUNT IS : 0000000000

 - - TESTING COMPLETED - -

DATE & TIME: ---- 5 NOV '81   16:23
PRI. OR RDT.: --- PRI
TEST OPERATOR: -- J GUYTON  J Guyton 5 NOV '81
OTHER TEST
CONDITIONS: ----- TERMINATE PRI SIDE COLD START UP.
```

Retest
FIR 8311

S8311

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T13
TEST PROGRAM NO. 13 - - - - - > SERIAL MAGNITUDE CMD AUTO DATA TEST -
                                SENDS ALTERNATING BIT PATTERN TO CMC P/D. AN
                                READS TELEMETRY & ACTUAL OUTPUT FOR VERF.


ENTER OPERATOR DATA, YES OR NO ! Y

ASSY. NO.: ------ 50900
CARD NAME: ------ SER MAG CMD REC/DEC  (A10)
SERIAL NO.: ----- 202
DATE & TIME: ---- 5 NOV '81   17:23
PRI. OR RDT.: --- RDT
TEST OPERATOR: -- J GUYTON
OTHER TEST
CONDITIONS: ----- RDT SIDE COLD STARTUP AT -25 DEGREES C.


TO START TEST EXECUTION
PRESS "G" KEY.

(TO TERMINATE TEST PRESS "ESC" KEY.)
G

RUN WITH CONSTANT DELAY, YES OR NO ! Y
PRINT VERIFICATION ERRORS, YES OR NO ! Y


CURRENT CYCLE COUNT IS : 0000064979

CURRENT ERROR COUNT IS : 0000000000

 - - TESTING COMPLETED - -

DATE & TIME: ---- 5 NOV '81   17:25
PRI. OR RDT.: --- RDT
TEST OPERATOR: -- J GUYTON  J Guyton 5 Nov '81
OTHER TEST
CONDITIONS: ----- TERMINATE RDT SIDE COLD STARTUP.


MONITOR
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Restest
F/R 8311

S8311

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T12
TEST PROGRAM NO. 12 - - - - > SERIAL MAGNITUDE CMD AUTO DATA TEST -
                              SENDS ALTERNATING BIT PATTERN TO SMC R/D. A
                              READS TELEMETRY & ACTUAL OUTPUT FOR VERF.


ENTER OPERATOR DATA. YES OR NO ! Y

ASSY. NO.: ------ 50900
CARD NAME: ------ SER MAG CMD REC/DEC (A10)
SERIAL NO.: ----- 202
DATE & TIME: ---- ~~5 NOV~~ '81   09:30  6 NOV '81 HGuyton
PRI. OR RDT.: --- PRI
TEST OPERATOR: -- J GUYTON
OTHER TEST
CONDITIONS: ----- OPERATIONAL TEMP 50 DEGREES C REACHED AT
                  09:50

TO START TEST EXECUTION
PRESS "G" KEY.

(TO TERMINATE TEST PRESS "ESC" KEY.)
G

RUN WITH CONSTANT DELAY, YES OR NO ! Y
PRINT VERIFICATION ERRORS, YES OR NO ! Y


CURRENT CYCLE COUNT IS : 0002151151

CURRENT ERROR COUNT IS : 0000000000

 - - TESTING COMPLETED - -

DATE & TIME: ---- 6 NOV '81  10:54
PRI. OR RDT.: --- PRI
TEST OPERATOR: -- J GUYTON
OTHER TEST
CONDITIONS: ----- TERMINATE PRI SIDE DATA CYCLING AT 50 DEHREES C.


MONITOR
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Retest
P/RE311

S8311 STR NO F-001

PG 1 OF 1

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SPECIAL TEST REQUEST

TITLE SERIAL MAGNITUDE COMMAND BOARD 55°C PENALTY TEST ORIGINATOR J. BANACH

INSTRUMENT/MODEL TM/FLT 50900/SN 201 MAJOR TEST PHASE ASSEMBLY ACCEPTANCE TEST

APPLICABLE DOC. 16389 APPROX. TEST TIME 2 HRS.

PURPOSE OF TEST: PERFORM ADDITIONAL PENALTY TESTING AT 55°C FOR 50900 S/N 201 BOARD IN RESPONSE TO FAILURE REPORT S8311. PREVIOUS PENALTY TESTING AT 58°C AND DOCUMENTED IN HS236-7714 WAS UNACCEPTABLE TO NASA OFFICER.QAR

TEST CONFIGURATION: BOARD ASSEMBLY TEST CONFIGURATION AS DEFINED IN TEST PROCEDURE 16389 PARA 5.4.1.2

TEST PROCEDURE: PERFORM TEST PROCEDURE 16389 PARA 5.4.1.2, WITH EXCEPTION THAT IT IS DONE AT 55°C INSTEAD OF SPECIFIED 50°C.

TEST SUCCESSFULLY COMPLETED. DATA ATTACHED.

Product Effectiveness L. Allgaier 11/17/81

TEST DIRECTOR J A Banach DATE: 11/17/81

SYST. ENGIN. [signature] DATE: 11/17/81

(USE CONTINUATION SHEETS IF REQUIRED)

58211

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MONITOR

T12
TEST PROGRAM NO. 12 - - - - - > SERIAL MAGNITUDE CMD AUTO DATA TEST -
                                SENDS ALTERNATING BIT PATTERN TO SMC R/D, AND
                                READS TELEMETRY & ACTUAL OUTPUT FOR VERF.

ENTER OPERATOR DATA, YES OR NO ! Y

ASSY. NO.: ------ 50900
CARD NAME: ------ SER MAG CMD REC/DEC (A10)
SERIAL NO.: ----- 202
DATE & TIME: ---- 17 NOV '81     16:00
PRI. OR RDT.: --- PRI
TEST OPERATOR: -- J GUYTON
OTHER TEST
CONDITIONS: ----- SPECIAL TEST REQUEST F-001, PRI SIDE DATA CYCLING AT
                  55 DEGREES C. (16389 PAR.5.4.1.2) RETEST.

TO START TEST EXECUTION
PRESS "G" KEY.

(TO TERMINATE TEST PRESS "ESC" KEY.)
G

RUN WITH CONSTANT DELAY, YES OR NO ! Y
PRINT VERIFICATION ERRORS, YES OR NO ! Y

55 DEGREES C REACHED AT 16:10


CURRENT CYCLE COUNT IS : 0002021729

CURRENT ERROR COUNT IS : 0000000000

 - - TESTING COMPLETED - -

DATE & TIME: ---- 17 NOV '81     17:10
PRI. OR RDT.: --- PRI
TEST OPERATOR: -- J GUYTON
OTHER TEST
CONDITIONS: ----- TERMINATE SPECIAL TEST F-001, PRI SIDE DATA CYCLING AT
                  55 DEGREES C.


MONITOR
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FAILURE REPORT

S 8312

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
THEMATIC MAPPER 15#236		PLT	13:06	MO 10 DA 30 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☑ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☑ ASSEMBLY ☐ SUBASSEMBLY	VERIFICATION BOX (ALL)	50948	201	
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☑ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☑ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ____ AXIS FOR ____ ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ MIN TYP ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: TEST Para 8 FAILS 'BAND E OUTPUT - EDT'

15. TEST PROCEDURE: 16422 PARA 5.1 | 16. ORIGINATOR: [illegible] ORG 22-13 DATE 10/30/81 | 17. CONTINUATION SHEET USED ☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS:
[illegible] 11/23
R108 IS SHORT-CIRCUITED [illegible] 11/23
NO OVERSTRESS OCCURRED per DEF HS 236-7745 (COPY ATTACHED)

19. FAILED ITEM NAME AND PART NUMBER:

20. ☑ FOLLOWING REWORK/RETEST REQUIRED
☐ REWORK/RETEST NOT REQUIRED BECAUSE
REMOVE PWB DEFECT (BRIDGE) AT R108.
RETEST PER 16422

21. AUTHORIZATION: [signature] ORG 22-13 DATE 10/30/81 | 22. CONTINUATION SHEET USED ☐

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: BRIDGE AT R108 REMOVED
RETESTED PER TEST PROCEDURE 16422 PARA 5.1

24. OPERATOR: 110

25. INSPECTOR: 110

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION SHEET USED
L TORRES	22-74	30 OCT 1981	J. GUYTON	22-13	4 NOV 1981	☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: ~~BAD PRINTED WIRE BOARD FABRICATION CAUSED PROBLEM.~~ DE 11/23
[illegible] COPY
34. ☑ CONTINUATION SHEET USED

31. FAB CLOSURE: [signature] 11/17/81

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: NAME HS 236-7745 (COPY ATTACHED)

34. BASIC CAUSE OF VERIFIED FAILURE									DEFECT CODE
	☐ DESIGN	☐ TEST EQUIPMENT	☐ MFG. PROCEDURE	☐ WIRING ERROR	☐ UNKNOWN	
	☐ ENVIRONMENTAL	☐ TEST PROCEDURE	☑ ASSY/FAB ERROR	☐ ROUGH HANDLING		
	☐ DEFECTIVE PARTS	☐ TEST SET-UP	☐ WORKMANSHIP	☐ WEAR-OUT		

35. FAILURE TYPE		36. FAILURE CLASSIFICATION		
☑ PRIMARY	☐ UNKNOWN	☐ CRITICAL	☐ MINOR
☐ INDUCED	☐ NO FAILURE	☑ MAJOR	☐ SAFETY

RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
J.J. Banach	22-13	4 NOV 1980	[signature]	22-41	11/17/81
RELIABILITY [signature]	ORG 51-41	DATE 11-17-81	40. CUSTOMER OR SUPPLIER [signature] 12/3/81		DATE

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EQUIPMENT CHECKOUT
FAILURE REPORT
CONTINUATION SHEET

5893/2 FR SERIAL NO. | CONT. SHEET LETTER*

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN, DATE EACH ENTRY.

ADDITIONAL FR CONTINUATION SHEET(S) USED ☐

30	THE QUALITY INSPECTION SUPERVISOR JOYCE M LIESCAMBE WAS CONTACTED BY W D ADAMS T M PROGRAM MANAGER AND INFORMED HER OF THE SMT PROBLEM ON THE CIRCUIT BOARD HOST BD ASSEMBLY 50948 S/N 201. SHE HAS CONTACTED MANUFACTURING AND QUALITY PERSONNEL AND TOLD THEM TO USE MORE CARE DURING INSPECTION AND MANUFACTURING OF FUTURE BOARDS FOR SBRC TO PREVENT RECURRENCE OF THIS PROBLEM.

W D Adams
12-2-81

16060A SC AUG 78

COPY 1 ROUTE WITH DISCREPANCY ITEM

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FAILURE REPORT

S 8313

ORIGINATOR

1. PROGRAM NAME AND NUMBER: Thematic Mapper NAS 236 | 2. GLA | 3. MODEL: FLT | 4. TIME OBSERVED: 1000 | 5. DATE OBSERVED: MO 11 DA 4 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☑ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☑ SUBASSEMBLY		50926	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☑ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☑ AMBIENT ☐ EMC/RR ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ☐ THERMAL VAC ____ HRS AT ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: failed para 3.3.2.3 SBRC 16234 (AR2 & AR5 Have excessive offset)

15. TEST PROCEDURE: TG234 | PARA: 3.3.2.3 | 16. ORIGINATOR: K Kloss | ORG: 22-10 | DATE: 11-4-81 | 17. CONTINUATION ☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: JUMPERS ACROSS DESIGNATED R35, R56, and R77 pads were missing per Not blueprint 50926 and stressed AR2, AR5, and AR8. (908961-4). A LATTLE REVIEW OF THE EFFECTS OF MISSING DISCREPANCY SHOWS THAT NO STRESSER

19. FAILED ITEM NAME AND PART NUMBER: AR2, AR5, AR8 (908961-4 QTY 3)

20. ☑ FOLLOWING REWORK/RETEST REQUIRED Install ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Jumpers per blueprint. Remove and replace AR2, AR5 & AR8

RETEST PER 3.3.2.3

21. AUTHORIZATION: J A Branch | ORG: 22-13 | DATE: 11-5-81 | 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: JUMPERS INSTALLED AR2, AR5, AR8 REMOVED AND REPLACED

24. CAGE CODE: 172

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
908961-4	AR2					
908961-4	AR5					
908961-4	AR8					

27. REWORK BY: H. SANCHEZ | ORG: 22-74 | DATE: 11/6/81 | 28. RETESTED BY: R Ellis | ORG: 22-13 | DATE: 1-8-82 | 29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: OPERATOR AND QA ERROR — JUMPERS CLEARLY CALLED OUT ON BIP SHEET 3. SUPERVISORS CAUTIONED. 2/9/82

31. CONTINUATION ☐ SHEET USED

33. FAB CLOSURE: 2/11/82

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
J A Branch	22-13	1-4-82		2241	2/12/82
39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER		DATE
	57-41	2-10-82	N.A.		

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FAILURE REPORT

CONTINUATION SHEET

FR SERIAL NO. SB313

CONTINUATION SHEET LETTER A

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN. DATE EACH ENTRY.

ADDITIONAL FR CONTINUATION SHEET(S) USED ☐

18	WERE EXCESSIVE. THE MISSING JUMPER WIRES WERE AT THE LM 10B OUTPUTS AND PROVIDED A NO LOAD CONDITION TO THE DEVICES. A LABORATORY CHECK OF A REMOVED AMPLIFIER (A2A) SHOWED NO VARIATION FROM A LABORATORY SAMPLE WHEN TESTED ON A CURVE TRACER - QP 2-16-82

3118731A (AN 80)

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FAILURE REPORT

S 8314

ORIGINATOR

1. PROGRAM NAME AND NUMBER: THERMAL MAGIC HS236 | 2. GLA | 3. MODEL: FLT | 4. TIME OBSERVED: 09:37:01 | 5. DATE OBSERVED: MO 11 DA 4 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☑ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☑ ASSEMBLY ☐ SUBASSEMBLY	VERIFICATION REGISTER	50948	201	
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☑ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☑ AMBIENT ☐ EMC/RR ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: FAILS TO RECEIVE PROPER SIGNAL AT U3-6 DUE TO BAD SOLDER CONNECTION AT U3-14.

15. TEST PROCEDURE: 16422 | PARA: 5.1.6.4 | 16. ORIGINATOR: GUYTON | ORG: 22-13 | DATE: 11/4/81 | 17. CONTINUATION ☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: BAD SOLDER JOINT. NO OVERSTRESS OCCURRED.

19. FAILED ITEM NAME AND PART NUMBER

20. ☑ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: RESOLDER U3-14

21. AUTHORIZATION: G Acc Guyton | ORG: 22-13 | DATE: 11/4/81 | 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: U3 PIN 14 RESOLDERED. RETESTED PER TEST PROCEDURE 16422 PARA 5.1 (SEE ATTACHED)

24. DATE REWORK: 110

25. DATE RETEST: 110

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY: H SANCHEZ | ORG: 22-74 | DATE: 4 NOV 1981 | 28. RETESTED BY: J. GUYTON | ORG: 22-13 | DATE: 4 NOV 1981 | 29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: BAD WORKMANSHIP, missed inspection point on lack of proper inspection. The responsible inspector has been notified of the error and cautioned to exercise greater care. Inspection stamp G.J.

31. CONTINUATION ☐ SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: NONE

33. PRB CLOSURE: 11/18/81

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☑ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☑ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☑ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
J. Gerard	22-13	NOV 4 1981	Signature for J Engel	22-41	11/18/81

39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
D. L. Crow	58-41	11-18-1981		

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FAILURE REPORT

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM		FLT	3:00	MO 11 DA 6 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☒ CARD ☐ PART

EQUIPMENT IDENTIFICATION: NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM			
8. UNIT Tail Sealing-Facelift-Lamp Sequence -Baffle (TAB)	51402	201	
9. ☐ ASSEMBLY ☐ SUBASSEMBLY			
10. ☐ MODULE ☐ MICAM ☐ CARD			
11. OTHER			

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____° ____ AXIS FOR ____ MIN TYPE ____ ☐ THERMAL VAC ____ HRS AT ____° ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: The ALL Lamps on LED failed to turn on at the proper bias in the tail lamp sequencer

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION SHEET USED
16282	4.3.2	Joe Kleeburg	22-13	11/6/81	☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Base Lead of Q10 is not making electrical contact with pad on the circuit board.

19. FAILED ITEM NAME AND PART NUMBER:

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Resolder Q10 Base pad lead to circuit trace per MRCO 298142R
Retest per TP 16282 Para 4.3.2

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION SHEET USED
J.A. Bonach	22-13	11-6-81	☐

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Jumper lead soldered per MRCO 298142R
Retested per TP 16282 Para 4.3.2 - (SEE ATTACHED)

24. QUALITY

25. RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION SHEET USED
H. SANCHEZ	22-74	11-9-81	J. KLEEBURG	22-13	11-11-81	☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: IN BONDING Q10 Base pad the trace contact was damaged and intermittent. - NO OTHER COMPONENTS STRESSED

~~Should have a EL Segundo bonding operation if needed~~ W/O

MR Otto Wakkuri and MR Miller the supervisor of the Quality Assurance have been made aware of this discrepancy by Program Manager W D Brown and Bill Wise were will be inspection when performed by order to

31. ☐ CONTINUATION SHEET USED

☒ FRB CLOSURE

11/18/81

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: SHIPMENT TO SARC W/O 11-18-81

34. BASIC CAUSE OF VERIFIED FAILURE									DEFECT CODE
	☐ DESIGN	☐ TEST EQUIPMENT	☐ MFG. PROCEDURE	☐ WIRING ERROR	☐ UNKNOWN	
	☐ ENVIRONMENTAL	☐ TEST PROCEDURE	☐ ASSY/FAB ERROR	☐ ROUGH HANDLING		
	☐ DEFECTIVE PARTS	☐ TEST SET-UP	☐ WORKMANSHIP	☐ WEAR-OUT		

35. FAILURE TYPE		36. FAILURE CLASSIFICATION		
☒ PRIMARY	☐ UNKNOWN	☐ CRITICAL	☒ MAJOR	☐ MINOR
☐ INDUCED	☐ NO FAILURE			☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
J.A. Bonach	22-13	11-17-81	[signature]	22-41	11/18/81
39. RELIABILITY [signature]	51-41	11-18-81	40. SUBCONTRACTOR OR SUPPLIER E.G.		DATE

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11/7/81

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FAILURE REPORT

S 8316

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TELEMATIC AMPLIFIER HS236		AT	14:10	MO 11 DA 9 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☑ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY	ELECTRONICS MODULE			
10. ☐ MODULE ☐ MICAM ☑ CARD	MACH DRIVER/CONV	51795	102	
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☑ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYP ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: 'CROSSTALK' AR2-8 TO AR2-10. ON THE AR 2 PIN 8 OUTPUT, THE HI LEVEL OF 4V HAS A 65VPP WAVEFORM RIDING AT THE CLOCK FREQUENCY. NOTE THIS TTL HI LOGIC SIGNAL STILL PROVIDES A NOISE MARGIN GREATER THAN 1.5V ABOVE THE MINIMUM 2.0V TTL HI REQUIRED BY RECEIVING ICS.

15. TEST PROCEDURE: 16423 | PARA: 5.3.5.4 | 16. ORIGINATOR: J GUYTON | ORG: 22-13 | DATE: 9 NOV 81 | 17. CONTINUATION ☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: TOSPERT FAULTY CHIP AR-2, DATA LINE REC (DS7820)

19. FAILED ITEM NAME AND PART NUMBER: AR-2 (909992-1)

20. ☑ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: REMOVE AND REPLACE AR-2
RETEST PER TP 16423 PARA 5.3.5.4

21. AUTHORIZATION: J Guyton | ORG: 22-13 | DATE: 11-9-81 | 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

22. REWORK/RETEST ACTION TAKEN: SEE DATA SHEET OF 11-10-81, SORC 16423, 5 WAVEFORM PHOTOS
SEE AHR 51795, SUPPL B, OP 403, 404 FOR REWORK OF AR-2

24. QA REWORK: 110

25. QA RETEST: 110

23. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY: L. TORRES | ORG: 22-73 | DATE: 11/10/81
28. RETESTED BY: J. GUYTON | ORG: 22-13 | DATE: 11/9/81
29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: EVEN THOU THE CHIP WAS WITHIN THE ALLOWABLE PARAMETERS, THE REA WAS HOPING TO IMPROVE THIS PARAMETER BY REPLACING THE CHIP.
IN ESSENCE THIS F.R. WAS OPEN IN ERROR. THEIR WAS NO "FAULTY" CHIP. UNNECESSARY REPLACEMENT OF CHIP.

31. CONTINUATION ☐ SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

33. FAB CLOSURE: 12/7/81

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
J Guyton	22-13	12-7-81		22-41	81/12/07
39. RELIABILITY	**ORG**	**DATE**	**40. CUSTOMER OR SUPPLIER**		**DATE**
Lee Crain	51-41	12-7-81			12/12/81

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EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP
FAILURE REPORT

S 8320

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
T.M. V011		FLIGHT	3:30 p.m.	MO 9 DA 24 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☒ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	ELECTRONIC MODULE	52347		
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	BAND 2 POST AMP	50904-7	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☒ TEMP 15°C ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: OUTPUT LOW OF CHANNEL II (HYBRID U4) SHORT CIRCUITED (~8 ohms) TO SIGNAL GROUND.

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION
16597	4.5	N. C. DAVISON	2213	9-25-81	☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: SOLDER SPLASH FOUND BETWEEN PIN 2.5 (O.L.) OF U4 AND THE CASE (SIGNAL GROUND). SOLDER SPLASH WAS REMOVED AND NORMAL BEHAVIOR WAS OBSERVED.

19. FAILED ITEM NAME AND PART NUMBER: U4 - 50559-4

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: NO PARTS FAILED

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION
			☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: SOLDER SPLASH WAS REMOVED. PART FUNCTIONS PROPERLY. STRESS ANALYSIS HS236-7744 SHOWS THAT NO OVERSTRESS OCCURRED.

24. QA REWORK: [signature]

25. QA RETEST: [signature]

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
NONE						

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION
						☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: SOLDER SPLASH INTRODUCED WHEN MOVING SELECT RESISTORS FROM STANDOFFS TO BOARD. NO OVERSTRESS OCCURRED. MANUFACTURING PERSONNEL HAVE BEEN REMINDED TO USE CAUTION WHEN SOLDERING COMPONENTS. Inspection personnel advised of condition and to take notice. Note when inspecting solder and review all adjacent areas. J. Barnett

31. CONTINUATION ☐ SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: NONE REQ'D

33. FRB CLOSURE: [signature] 11/4/81

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☒ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE — 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	2122	11-3-81	[signature]	2261	11/11/81

39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
J. Huber	51-11	11-02-81	[signature] 11/3/81	

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FAILURE REPORT

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S 8321

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
T.M. V011		FLIGHT	3:15	MO 10 DA 4 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	BAND 4 AST AMP BOARD	50904-4	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ ESC/RR ☐ RADIATION ☐ VIBRATION ☒ TEMP 15 °C ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: AT 52KHz FREQUENCY RESPONSE WAS: -2.24 dB (SHOULD BE -2.50 TO -3.01.) CH. 6 ONLY.

15. TEST PROCEDURE: 16597 | PARA 4.6 | 16. ORIGINATOR: N.C. DAVISON | ORG 2243 | DATE 10-5-81 | 17. CONTINUATION ☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS

19. FAILED ITEM NAME AND PART NUMBER

20. ☐ ALLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: Since the wideband noise of 2.1 dB is well within the spec of ±2.4 dB, it is not considered cost effective to rework. No misbreath of any components.

21. AUTHORIZATION: [signature] | ORG 2122 | DATE 10/16/81 | 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CIT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Workmanship during selection of board and solder cusitors. Unsuitable for operation. Waiver W-120 attached

31. CONTINUATION ☐ SHEET USED

EFFECTIVITY: SN 201 FLIGHT UNIT

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: WAIVER-120 (COPY ATTACHED)

33. FRB CLOSURE: [signature] 11/2/81

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☒ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	41-22	11/16/81	[signature]	2241	11/17/81

39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
[signature]	51-21	11/20/81	[signature]	

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Program Instruction 010

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REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR -481 FOR INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO.

1. ORIGINATOR NAME AND ADDRESS David M. Randall
SBRC, 75 Coromar Dr., Goleta, Ca. 93117

1. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIV NO.
F	11323	TM	W-120

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	ADD. NO.
11323	50904-4	G	-

9. TITLE OF DEVIATION/WAIVER
Permission to use Band 4 Postamp SN 201

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF DEFECT

12. CD NO.	13. DEFECT NO	14. DEFECT CLASSIFICATION
II		[X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED	16. PART NO. OR TYPE DESIG.	17. LOT NO.	18. QTY	19. REQUIRING DEVIATION/WAIVER
Band 4 Postamplifier	50904-4	201	1	[ ] YES [X] NO

20. EFFECT ON COST/PRICE
None if approved.

21. EFFECT ON DELIVERY SCHEDULE
None if approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER

Permission to use Band 4 Postamp with Ch 6 frequency response -2.24 dB down vs a specifiation of -2.5 to -3.0 dB down at 52KHZ.

24. NEED FOR DEVIATION/WAIVER

This parameter is in violation of a unit level specification; not a system specification. Rework to the Postamp PWB may result in a lifted pad. The Band 4 Band Level Assy has been bonded into LED bracket and can no longer be cooled to allow reselection of resistors. Rework is not considered necessary since Wide Band Noise of Channel 6 is 2.1pA.

REA 11/16/81 SYS ENGR for J Engel 11/17/81 RE QA 11-18-81 PE 11-18-81

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER

26. PROCURING ACTIVITY APPROVING SIGNATURE for J Engel TITLE Minor - System Engineering; Major/Critical - Program Manager

27. APPROVAL, DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY NASA GSFC SIGNATURE George B. Hartt DATE 11/30/81

DD FORM 1694

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FAILURE REPORT

S 8325

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
VOII TM		FLIGHT	FIRST SHIFT	MO 08 DA 25 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	Electronics Module			
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	BAND 3 Post-Amp	50904-X3	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11 OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ____ ☒ TEMP 15 °C ☐ THERMAL VAC ____ HRS AT ____ °C ☐ OTHER

14. DESCRIPTION OF FAILURE: CH. 1, 7, 8, 13, 15 D.C. OFFSET OUT OF SPEC SHOULD ± 1.0V IS CH. 1 - 1.1V, CH. 7 - 1.2V, CH. 8 +1.2V, CH 13 - 1.5V CH 15 - 1.3V

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION SHEET USED
16597	4.4	E.R. Low	2243	08-25-81	☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Channels 1, 7, 8, 13, 15 apparently out of spec due to post-gain resistors being out during testing

19. FAILED ITEM NAME AND PART NUMBER: N/A

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: Channels 1, 7, 8, 13, 15 actually meet spec as tested with post-gain resistors out. Refer to E.C.R. # TM2512/01R1 of spec 16597 Rev J for allowable D.C. voltage offsets. See attached for voltage offset calculations.

21. AUTHORIZATION | ORG | DATE | 22. CONTINUATION SHEET USED ☐

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: None Required. No over-stressing of components occurred.

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
None						

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION SHEET USED ☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Spec changed per E.C.R. # TM2512/01R1 to define role of post-gain resistors in D.C. offset voltage measurements. No. 1 spec limits are based on calculations that take gain into consideration.

11/9/81

NOTE: REV. J OF SPEC. 16597 INCORPORATES ECR # TM2512/01R1. EFFECTIVITY IS S/N 003 & UP.

31. FRB CLOSURE | 31. CONTINUATION SHEET USED ☐

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: E.C.R. # TM2512/01R1 to spec 16597

11/9/81

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☒ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
	2243	11/9/81		22-61	11/11/81

39. QUALITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
	51-41	11/13/81		11/16/81

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FAILURE REPORT

S 8326

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
V011 TM		FLIGHT	FIRST SHIFT	MO 10 DA 04 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	Electronics Module			
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	BAND 4 POST AMP	50904-304	204	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☒ TEMP 15 °C ☐ THERMAL VAC ____ HRS AT ____ °C ____ AXIS FOR ____ MIN TYP ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: Ch. 6 & 8 out of spec offset voltage should be ± 1.0V. Is Ch 6 +1.3V, Ch. 8 +1.5V

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION ☐ SHEET USED
16597	4.4	C. R. Lee	2213	10-04-81	

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Channels 6,8 apparently out of spec due to post-gain resistors being out during test.

19. FAILED ITEM NAME AND PART NUMBER: N/A

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: Channels 6,8 actually meet spec as tested with post-gain resistors out. Refer to ECR# TM2512/01R1 of Spec 16597 Rev J for allowable voltage offsets. (See attached for allowable voltage offset calculations.)

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: None Required. No over-stressing of components occurred.

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
None						

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Spec changed per E.C.R. #TM2512/01R1 to define role of post-gain resistors in D.C. offset voltage measurements. New spec limits are based on calculations taking this into consideration. TOLE

NOTE: EFFECTIVITY IS REV. J. OF SPEC. 16597 INCORPORATES ECR# TM 2512/01R1. EFFECTIVITY IS S/N 003 & UP

31. CONTINUATION ☐ SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: ECR# TM2512/01R1 to Spec 16597

33. FRB CLOSURE: 11/4/81

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☒ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN

DEFECT CODE:

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE

39. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
W. Randall	2412	11/4/81	J. Cargal	22-61	11/16

39. SECURITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
Conner	5174	11/3/81	N.A.S.A.	

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FAILURE REPORT

S 8327

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
V011 TM		FLIGHT	FIRST SHOT	MO 09 DA 26 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	Electronics Module			
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	Post Amp BAND 4	50904-84	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ____ ☒ TEMP 15 . 6 ☐ THERMAL VAC ____ HRS AT ____ . ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: Ch. 5, 8, 12, 13 out of spec offset voltage should be ± 1.0V is Ch. 5 +1.5V, Ch. 8 +2.5V, Ch. 12 +1.5V, Ch. 13, +1.3V.

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION ☐ SHEET USED
16597	4.4	C.R. Lee	2213	9-26-81	

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Channels 5, 8, 12, 13 apparently out of spec due to post-gain resistors being fitted during testing.

19. FAILED ITEM NAME AND PART NUMBER: N/A

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: Channels 5, 8, 12, 13 actually meet spec as tested with post gain resistors out. Refer to ECR TM2512/01R1 of spec 16597 Rev J for allowable voltage offsets. (See attached for allowable voltage offsets calculations.)

21. AUTHORIZATION | ORG | DATE | 21. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: None Required. No over-stressing of components occurred.

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
None						

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Spec changed per ECR #2512/01R1 to define role of post-gain resistors in D.C. offset voltage measurements. New spec limits are based on calculations that take gain into consideration.
11/9/81

NOTE: REV. J. OF SPEC. 16597 INCORPORATES ECR # TM 2512/01R1. EFFECTIVITY IS TN003 & UP.

31. FRB CLOSURE ☐ SHEET USED
11/4/81

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: ECR #TM 2512/01R1 to spec 16597

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☒ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
	2213	11/4/81		22-61	81/11/6

39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
	52-41	11/13/81		11/9/81

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FAILURE REPORT

S 8329

ORIGINATOR

1. PROGRAM NAME AND NUMBER: V011 TM | 2. GLA: | 3. MODEL: FLIGHT | 4. TIME OBSERVED: FIRST SHIFT | 5. DATE OBSERVED: MO 10 DA 01 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	Electronics Module			
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	BAND 2	50904-2	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RR ☐ RADIATION ☐ VIBRATION ☒ TEMP 15 °C ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: Ch.s 1, 7, 8 out of spec on offset voltage. Should be 0 ± 1.0 V is Ch.1 -1.5V, Ch.7 +1.5V, Ch.8 -1.5V

15. TEST PROCEDURE: 16597 | PARA: 4.4 | 16. ORIGINATOR: C. R. Lee | ORG: 2213 | DATE: 10-01-81 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Channels 1, 7, 8 apparently out of spec due to the fact that post-gain resistors were out during 16597, Para 4.4 testing.

19. FAILED ITEM NAME AND PART NUMBER: N/A

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: Channels 1, 7, 8 actually meet spec as tested with post-gain resistors out. Refer to E.C.R. # TM2512/01R1 of spec 16597 Rev J for allowable D.C. voltage offsets. (See attached for voltage offset calculations.)

21. AUTHORIZATION | ORG | DATE | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: None Required. No over-stressing of components occurred.

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
None						

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Spec changed per E.C.R. # TM2512/01R1 to define role of post-gain resistors in D.C. offset voltage measurements. New spec limits are based on calculations that take gain into consideration. Thomas 11/13/81

NOTE: REV. J OF SPEC. 16597 INCORPORATES ECR # TM2512/01R1. EFFECTIVITY IS S/N 003 & UP.

31. FAB CLOSURE: 11/16/81

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: ECR # TM2512/01R1 to spec 16597

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
	22-22	11/16/81		22-64	11/16/81

39. QUALITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
	51-41	11/18/81	DCS	

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FAILURE REPORT

S 8343

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
THEMATIC MAPPER		FLT		MO 2 DA 16 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☒ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	ELECTRONICS MODULE	52347	201	
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYP ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: SMA VOLTAGES OUT OF SPEC, ±28 WAS ±27.5, 7 WAS 6.2
SEE ATTACHED DATA SHEET (OPER 1850)
CDVU and RADIOMETER TOLERANCES REVERSED ON HI/LO LIMIT SPECS - BOTH READINGS OUT OF SPEC

15. TEST PROCEDURE: 16704 | PARA 4.23.9.2b | 16. ORIGINATOR: J GUYTON | ORG 22-13 | DATE 3-4-82 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: TP 16704 PAR 4.23.9.2b SETS LOW LIMIT POWER SUPPLY INPUT TO 21 (+5, -0) VDC. SHOULD HAVE BEEN TESTED AT 23 (+5, -0) VDC. CDVU and Radiometer Voltage tolerances should have been reversed

19. FAILED ITEM NAME AND PART NUMBER:

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE
RETEST PER PARA 4.23.9.2b EO 4180A
P

21. AUTHORIZATION: J A Bonach | ORG 22-13 | DATE 3-5-82 | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: PARA 4.23.9.26 PERFORMED SMA +28 V READ 30.8 VDC
SMA -28V READ -30.7 VDC BOTH WITHIN SPEC EO 4180A IMPLEMENTED
SEE ATTACHED COPY OF TEST DATA SHEET (OPER 1850)
EO 4199A CORRECTED NOMENCLATURE AND TOLERANCES - ALL READINGS ARE WITHIN SPEC

24. QA REWORK: QA P

25. QA RETEST: QA

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY | ORG | DATE

28. RETESTED BY: J A Bonach | ORG 22-13 | DATE 3/5/82 | 29. ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: CAUSE: ELECTRONIC MODULE UNIT TEST PROCEDURES CALLED OUT IMPROPER VOLTAGE SETTINGS PLUS THE CDVU AND RADIOMETER TOLERANCES WERE REVERSED.
C/A: EO 4180A AND 4199A CORRECT THE ELECTRONIC MODULE TEST PROCEDURE.
[signature] 3/10/82
COPIES OF EO 4180A & 4199A ARE ATTACHED.

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: EO 4180A EO 4199A-EFFECTIVITY SN 003 & SUBSEQ

33. FRB CLOSURE: [signature] 3/10/82

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
J A Bonach	22-13	3-9-82	[signature]	22-41	3/10/82
39. RELIABILITY [signature]	51-41	3-10-82	40. CUSTOMER OR SUPPLIER		DATE

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3/10/82

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FAILURE REPORT

S 8363

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
THEMATIC MAPPER		FLT	10:00	MO 1 DA 13 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☒ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD	BAND 3 POST AMPLIFIER	50904-3	201	
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ☐ THERMAL VAC ____ HRS AT ____ ☐ AXIS FOR ____ ☐ MIN TYP ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: NOMINAL GAIN ≈ 2.0 V.S. SPECIFICATION ≥ 3.4 FOR EACH CHANNEL. R81 thru R96 ARE ≥ 10K ohms HOWEVER THE 12.1K R81 thru R96 SELECT RESISTORS ARE VALID. THE TEST SPECIFICATION WAS NOT CONSISTENT WITH THE R81 to R96 SELECT RANGE.

15. TEST PROCEDURE: 16704 | PARA: 4.19.3 | 16. ORIGINATOR: GUYTON | ORG: 22-13 | DATE: 1/13/82 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Dwg 50904 SPECIFICATION FOR R81 thru R96 is NOMINAL 3.83K Ω THE TP 16704 PARA 4.19.3 thru 4.19.4 Spec Limits derived from the range of Post Amplifier gains are not consistent with the range of R81 thru R96 pre gain resistors

19. FAILED ITEM NAME AND PART NUMBER:

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Correct TP 16704 Para 4.19.1 thru 4.19.4 Spec Limits to conform to pre gain resistor select range.

21. AUTHORIZATION: J A Bonach | ORG: 22-13 | DATE: 1-7-82 | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: EO 4059A writen to correct spec limits
Test data falls within spec limits no retest required.

23. QA REWORK: 107 1/27/82

23. QA RETEST: 107

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY: J A Bonach | ORG: 22-13 | DATE: 1-22-82 | 28. RETESTED BY | ORG | DATE | 29. ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION
CAUSE: PARAGRAPH 4.19.1 THRU 4.19.4 OF TEST PROCEDURE 16704 HAD INCORRECT SPEC. LIMIT
C/A: EO 4059A CORRECTS SPEC. LIMITS OF TP 16704.

31. ☐ CONTINUATION SHEET USED

33. FAB CLOSURE: 2/2/82

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: EO 4059 A (COPY ATTACHED)

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☒ TEST EQUIPMENT ☒ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
J A Bonach	22-13	1/28/82	for J Engel	SORC	2/2/82

39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
	51-41	2/1/82		

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FAILURE REPORT

S 8364

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
THEMATIC MAPPER		FLT	11:30 A.M	MO 1 DA 28 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☒ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	ELECTRONICS MODULE	52347	201	
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	REDUNDANT SHUTTER DRIVER	51398	101	
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RR ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: WHEN MAIN SHUTTER ON (CMD 13) ISSUED, THE REDUNDANT SHUTTER DRIVER WAS NOT COMMANDED OFF

15. TEST PROCEDURE: 16704 | PARA: 4.12.4.2 | 16. ORIGINATOR: J.A Bonach | ORG: 22-13 | DATE: 1/28/82 | 17. CONTINUATION ☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: THE REDUNDANT SHUTTER DRIVER (51398) COMMAND RELAY'S COIL IS NOT WIRED TO "ORING" DIODES PER 51398 BLUEPRINT. P1B-103/104 IS TO CR42-A; P1-107/108 IS TO CR42-C. VOLTAGE ACROSS RELAY COIL DID NOT EXCEED NORMAL OPERATING VOLTAGES. RE-OVERSTRESS WAS POSSIBLE

19. FAILED ITEM NAME AND PART NUMBER

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: REWORK PER 51398 JUMPER LIST ITEMS 6 AND 9 S/B P1-103/104 TO CR42-C P1-107/108 TO CR42-A

21. AUTHORIZATION: J.A Bonach | ORG: 22-13 | DATE: 1/28/82 | 24. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

22. REWORK/RETEST ACTION TAKEN: 51398 PWB P1-103/104 MOVED TO CR42-C P1-107, 108 MOVED TO CR42-A

23A. QA REWORK: 107

RETESTED PER PARA 4.12.4.2 CORRECTLY

23B. QA RETEST: 107 2/2/82

25. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORKED BY: Thelma Sachs | ORG: 22-74 | DATE: 1/28/82 | 28. RETESTED BY: J.A Bonach | ORG: 22-13 | DATE: 1/28/82 | 29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: CAUSE: Rework planning to remove & resolder connector incomplete. Jumper wires 2 places had to be disconnected & resoldered to do this rework & was not in planning. Inspection not alerted to the need to reverify termination of jumper wires. CORRECTIVE ACTION: Mfg. Eng. Supervisor informed of the error & he has agreed to exercise greater care during future planning operations. 2/4/82

31. CONTINUATION ☐ SHEET USED

22. FRB CLOSURE: J.A Bonach 2/4/82

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☒ MFG. PROCEDURE / ASSY/FAB ERROR / WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN

DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: J.A Bonach | ORG: 22-13 | DATE: 1/29/82

38. SPACECRAFT SYSTEM ENGINEER: for J. Engel | ORG: 58RC | DATE: 2/4/82

39. RELIABILITY: | ORG: 5.4 | DATE: 2/5/82

40. ASSIGNOR OR SUPPLIER: | DATE:

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FAILURE REPORT

S 8365

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TDRSS MSPA/R | 2. GLA: | 3. MODEL: FLT | 4. TIME OBSERVED: 4:00 PM | 5. DATE OBSERVED: MO 2 DA 3 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☒ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☒ CARD ☐ PART

EQUIPMENT IDENTIFICATION	NAME	PART NUMBER	S/N	MANUFACTURER
7 SUBSYSTEM				
8 UNIT				
9 ☐ ASSEMBLY ☒ SUBASSEMBLY				
10 ☐ MODULE ☐ MICAM ☒ CARD	B4 POSTAMP	50804-4	201	
11 OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: KLEEBURGER, CHS 1, 9, 10.

15. TEST PROCEDURE: 16368 | PARA: 4.12 | 16. ORIGINATOR: [signature] | ORG: 22-13 | DATE: 2-4-82 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS

APPEARS KLEEBURG CAPS NOT ACTUALLY CONNECTED INTO CIRCUIT. MORE INVESTIGATION REQ'D.

19. FAILED ITEM NAME AND PART NUMBER: B4 POSTAMP 50804

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: REWORK BY CORRECTING LEAD B, CST, C61, C65, C69. RETEST PER 16368 P 4.3.1, 4.3.5, 4.3.7, 4.3.10, 4.3.11, AS NUMBERED IN REV C.

21. AUTHORIZATION: [signature] | ORG: 22-13 | DATE: 2-4-82 | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN

AS ABOVE. LEAD B OF CST, C61, C65, C69 WAS CORRECTLY PLACED. PULL TEST WAS DONE. TEST OK

24. DATE REWORK: 2-4-82

25. DATE TEST: 2-4-82

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
NONE						

27. REWORK BY: DUNCAN | ORG: | DATE: 2-4-82 | 28. RETESTED BY: [signature] | ORG: 22-13 | DATE: 2-4-82 | 29. ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION

POOR WORKMANSHIP

ASSEMBLY TECHNICIAN WAS ADVISED OF DISCREPANCY AND CAUTIONED TO CHECK ALL WIRING AND CONNECTIONS THOROUGHLY.

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

32. FRB CLOSURE: [signature] 2/11/82

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE:

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] | ORG: 22-13 | DATE: 2/9/82 | 38. SPACECRAFT SYSTEM ENGINEER: [signature] | ORG: 22-41 | DATE: 2/11/82

39. RELIABILITY: [signature] | ORG: 57-41 | DATE: 2-8-82 | 40. CUSTOMER OR SUPPLIER: [signature] 2/15/82 | DATE:

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EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP
FAILURE REPORT

S 8367

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM PL 1162	V411	FLT	5:30	MO 1 DA 19 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☒ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD	Calibration Shutter	50916	201	SBRC
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☒ TEMP 0°C ☐ THERMAL VAC ____ HRS AT ____ ☐ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: Shutter Taps Stopson Turn on at 0°C Ref. Per 139.5 ms

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION SHEET USED
16238	3.5.3	L Evans	2213	1/19/82	☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Found Saturation Time of AR6-6 gets Longer with Cold Temp. ReTuned R98 and R90 To correct problem. No Stress To Components

19. FAILED ITEM NAME AND PART NUMBER

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Change R98 To 100.5 kΩ, Change R90 To 205 kΩ ReTest Per 16238 Para 3.5.1, 3.5.2, 3.5.3, 3.5.4, 3.6.1, 3.6.2,

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION SHEET USED
L Evans	2213	1/23/82	☐

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Removed and Replaced R98
" " " R90
ReTest per TP/16238 Para 3.5.1, 3.5.2, 3.5.3, 3.5.4, 3.6.1, 3.6.2,

24. REWORK: 1 (107)

25. RETESTED: 1 (107)

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION SHEET USED
M. Caudill		1/23/82	Joe Rosberg	2213	1/26/82	☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: At cold Temp. it was found that optimum values had not been selected, therefore we retuned circuit.

31. FAB CLOSURE: 2/2/82

31. CONTINUATION SHEET USED ☐

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☒ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

38. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	39. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
J A Gonda	22-13	1/28/82	K Wong for Kruger	SBRC	2/2/82

39. SECTION HEAD	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
	57-44	2/1/82	G.F. 2/4/82	

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SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

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FAILURE REPORT

S 8384

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
THEMATIC MAPPER		FLT	17:00	MO 1 DA 26 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☒ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

ORIGINATOR

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	ELECTRONICS MODULE	52347	201	
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	REDUNDANT SHUTTER DRIVER	51398	201	
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: REDUNDANT SHUTTER PHASE LOCK TELEMETRY WORD G BIT G READS INCORRECTLY "HI" WHEN THE REDUNDANT SHUTTER FUNCTION IS COMMANDED OFF (CMD "OF")

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION
TP16704	4.12.42	J A Banach	22-13	1-27-82	☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: REDUNDANT SHUTTER DRIVER (51398) PHASE LOCK SIGNAL U24 PIN 14 DOES NOT HAVE "PULL DOWN" RESISTOR TO ALLOW EXTERNAL RECEIVING TTL I.C. TO READ SIGNAL CORRECTLY WHEN 51398 IS POWERED OFF. "PULL DOWN" RESISTOR R168-B INCORRECTLY WIRED TO U12 PIN 10. SHOULD BE R168-B WIRED TO U12 PIN 11

19. FAILED ITEM NAME AND PART NUMBER: NONE

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: MOVE R168-B CONNECTED WIRE FROM U12 PIN 10 TO U12 PIN 11

RETEST PER TP16704 PARA 4.12.4

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION
J A Banach	22-13	1-27-82	☒ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: REWORKED TO BLUEPRINT AS IN LINE 20

24. QA REWORK: 107

RETESTED PER PARA 4.12.4.2 CORRECTLY

25. QA RETEST: 107

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORKED BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION
A. Banach	22-74	1/27/82	J Banach	22-13	1/28/82	☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: CAUSE: Incorrect wiring of U12 Pin 11 by assembly personnel and missed during inspection. CORRECTIVE ACTION: 1) Assembly Supervisor was informed of the error and has instructed his assemblers to exercise greater care in the future. 2) Inspection Supervisor also informed of error and has instructed inspectors to exercise greater care in future inspections. (K.J.S.)

31. CONTINUATION ☐ SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

33. FRB CLOSURE: 2/4/82

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☒ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
J A Banach	22-14	1/28/82	for J Engel	SBRC	2/4/82
39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER		DATE

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2/5/82

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FAILURE REPORT

CONTINUATION SHEET

FR SERIAL NO. S 8384

CONTINUATION SHEET LETTER A

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

ADDITIONAL FR CONTINUATION SHEETS USED ☐

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN, DATE EACH ENTRY.

18	MISWIRING REDUCED LOAD ON U24 D. EFFECTIVELY R 168 WAS NOT CONNECTED TO GROUND AND DID NOT DRAW CURRENT THROUGH U24 D. NO OVERSTRESS OCCURRED. AP

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FAILURE REPORT

S 8390

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
THEMATIC MAPPER		FLT	11 PM	MO 2 DA 14 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☒ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☒ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	ELECTRONICS MODULE	52347	201	
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☒ MODULE ☐ MICAM ☐ CARD	ELECTRICAL MODULE			
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RR ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: SMA +28V MEASURED 30.8V, SPEC IS 28V ≤ 30.5 VDC
SMA -28V MEASURED -30.8 V, SPEC IS -28V to -30.5 VDC

15. TEST PROCEDURE: 16704 4.23.9.6 PARA 4.23.9.6 | 16. ORIGINATOR: GUYTON | ORG 22-13 | DATE 17 FEB 82 | 17. CONTINUATION ☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: THE SMA ±28 V OUTPUTS UNDER FULL LOAD CONDITIONS READ 300 MV OUT OF SPECIFICATIONS AS PREVIOUSLY DEFINED IN POWER SUPPLY DESIGN SPEC. THE POWER SUPPLY BOA DEFINES TS16603 REV B AS CORRECT

19. FAILED ITEM NAME AND PART NUMBER

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE MODIFY TEST PROCEDURE TO SPECIFY 28 TO 31 VDC FOR SMA +28V
MODIFY TEST PROCEDURE TO SPECIFY -28 TO -31.5 VDC FOR SMA -28V
VIA E.O. TO CONFORM TO POWER SUPPLY TEST SPEC 16603 REV B

21. AUTHORIZATION: J.A. Bozak | ORG 22-13 | DATE 2-22-82 | 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: NONE | 24. QA REWORK | 25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: TEST SPECIFICATION INCONSISTENCIES CORRECTED. TOLERANCE INCREASED TO ±28V, ±31V AS TO 28 < V < 31 VDC AND -28 < V < -31 VDC.

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: EO 4459 A EFFECTIVITY 3/4/82 3 & UP COPY ATTACHED

33. FRB CLOSURE: 2/25/82

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☒ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
J.A. Bozak	22-13	2-24-82		22-41	2/25/82
39. RELIABILITY V.C. Lukens	ORG 51 41	DATE 2-25-82	40. CUSTOMER OR SUPPLIER		DATE

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2/24/82

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FAILURE REPORT

S 8407

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM V011		FLIGHT	0930	MO 07 DA 15 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☒ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	ELECTRONICS MODULE	52347 3		
9. ☐ ASSEMBLY ☒ SUBASSEMBLY		50904-X	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☒ TEMP 15 °C ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CH. 5 R 83 IS 60.4KΩ, SHOULD BE 10.0KΩ. R67 IS 10.0KΩ, SHOULD BE 60.4KΩ
CH. 14, R 95 IS 20.5KΩ, SHOULD BE 17.4KΩ, R31 IS 17.4KΩ, SHOULD BE 20.5KΩ

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION ☐ SHEET USED
16597	4.5	C. R. Lane	2213	07-15-81	

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: VISUAL ANALYSIS SHOWS R83 & R67 REVERSED; R31 & R95 REVERSED. R95 (PREGAIN) SHOULD HAVE BEEN 17.4KΩ
R83 (PREGAIN) SHOULD HAVE BEEN 10.0K ; R67 (ROLLOFF) SHOULD HAVE BEEN 60.4K
R31 (OFFSET) SHOULD HAVE BEEN 20.5K

19. FAILED ITEM NAME AND PART NUMBER: N/A

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: REWORK TO PRINT & CONTINUE TEST.

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION ☐ SHEET USED
[signature]	2213	7-15-81	

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: RESISTORS WERE REINSTALLED PROPERLY.
NO OVERSTRESS PER HS236-7694 AND HS236-7556

24. QA [signature]

25. QA RETEST [signature]

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
NONE						

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: WORKMANSHIP ERROR WHEN MOUNTING SELECT RESISTORS FROM STANDOFFS TO THE BOARD. MANUFACTURING PERSONNEL HAVE BEEN READVISED TO USE CARE WHEN REMOVING AND REINSTALLING SELECT RESISTORS, INSPECTION PERSONNEL HAVE BEEN INSTRUCTED TO EXERCISE GREATER CARE IN INSPECTING SELECT INSTALLATIONS AND SURROUNDING AREAS.

31. FRB CLOSURE [signature] 11/4/81

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: NONE REQ'D

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE — 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	2122	11-3-81	[signature]	2261	11/4/81
39. RELIABILITY A. Huber	ORG 5111	DATE 11-03-81	TEST SPECIALIST OR SUPPLIER [signature] 11/5/81		DATE

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FAILURE REPORT

S 8446

ORIGINATOR

1. PROGRAM NAME AND NUMBER: VC11 T.A1. | 2. GLA: | 3. MODEL: FLIGHT | 4. TIME OBSERVED: 3:30 P.M. | 5. DATE OBSERVED: MO 8 DA 6 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	ELECTRONICS MODULE 4 (MK)	52347		
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	BAND 3 POSTAMP	50904A	201	SBRC.
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RR ☐ RADIATION ☐ VIBRATION ☒ TEMP 15 °C ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CHANNEL 8 pegged.

15. TEST PROCEDURE: 16597 | PARA 4.5 | 16. ORIGINATOR: N. C. DAVISON | ORG 2213 | DATE 8-7-81 | 17. CONTINUATION ☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: RESISTORS R28 AND R12 INTERCHANGED
R28 (OFFSET ADJ) SHOULD HAVE BEEN 22.5K
R12 (BOOST) SHOULD HAVE BEEN 3.65K

19. FAILED ITEM NAME AND PART NUMBER: BAND 3 POST AMP PWB

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE
REVERSE R28 AND R12 AND CONTINUE TEST/SELECTION PROCESS.

21. AUTHORIZATION: N. C. DAVISON | ORG 2213 | DATE 8-7-81 | 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: RESISTORS WERE REINSTALLED PROPERLY.
NO OVERSTRESS PER HS 236-7691.

24. QA REWORK: [illegible]

25. QA RETEST: [illegible]

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
NONE						

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: WORKMANSHIP ERROR WHEN MOVING SELECT RESISTORS FROM STANDOFFS TO BOARD. MANUFACTURING PERSONNEL HAVE BEEN READVISED TO USE CARE WHEN REMOVING AND REINSTALLING SELECT RESISTORS. INSPECTION PERSONNEL HAVE BEEN INSTRUCTED TO EXERCISE GREATER CARE IN INSPECTING SELECT INSTALLATIONS AND SURROUNDING AREAS.
J. Bamlet

31. CONTINUATION ☐ SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: NONE REQ'D

33. FRB CLOSURE: 11/4/81

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	2722	11-3-81	[signature]	2261	11/11/81

39. RELIABILITY	ORG	DATE	40. USA OVER OR SUPPLIER	DATE
A. Huber	51-11	11-03-81	[signature] 11/5/81	

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PART NO. 50964-B4-1	PART NAME PWB Assy. Post Amp Band 3 & 4	ASSY/LOT SERIAL NO. 201	QTY 1

OPER NO.	DATE	OPERATOR OR INSP	COMMENTS, TEST DATA, ETC	DISPOSITION	APPROVAL
4TE 4360 Supp. 14 1303	8-7-81	[illegible] 19	See FR 8446 - "Channel 8 is reffed"	Reject Acc. FR 8446	
				REWORK PER F.R.	
			1. REMOVE EXISTING RESISTERS FROM R12 & R28	8446 & B/P	8-6-81
	8-11-81		2. INSTALL ON STANDOFF WIRE AT R12 (3.65 K)		
			3. PERMANENTLY INSTALL AT R28 (22.1 K)	8-11-81	
			PER B/P.		
			4. RETURN TO TEST FOR RE-SELECTION PER		
			SPEC. 16597 ~~REV~~ Supp #14 opn # 1303.		

SBRC FORM NO 0314 (4 73)

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58446

S8446

SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company

INTERNAL MEMORANDUM

TO: L. O'Connell

CC: Altman, L.
Barnett, G.C.
Davison, N.C.
Randall, D.M.
Rangel, J.
Wilkerson, R.J.
Data Bank (8)

DATE: 26 October 1981

REF: HS 236-7691
REAH 81/53

FROM: A. Huber

BLDG. B-11 MAIL STA. 102
EXT. 6246

SUBJECT: FR: S8446
(Band 4 Postamplifier Board,
50904, Flight)

FR: S8446, dated August 6, 1981

The failure was encountered when retesting Band 4, channel 8, after select resistors were removed from standoffs and placed directly onto the 50904 post-amplifier board. It was found that in moving the resistors to the board, two resistors were interchanged. The resistors were R28 (22.5K, offset) and R12 (3.65K, boost). The resistors were subsequently moved to their proper locations. Figure 1 illustrates the offset and boost circuits which resulted from the interchange of resistors. No overstress occurred.

Andrew E. Huber
A.E. Huber

AEH:jc

58446

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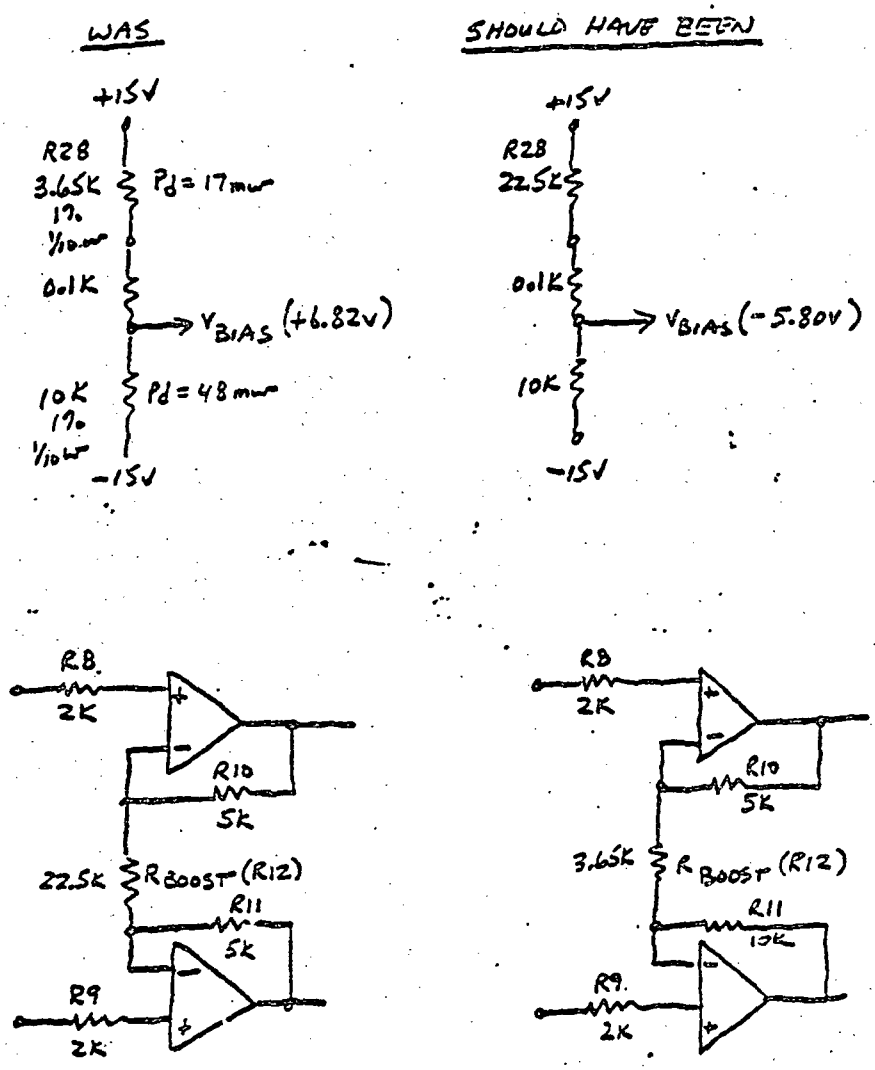

FIGURE 1 : OFFSET AND BOOST CIRCUITS RESULTING FROM INTERCHANGE OF R28 AND R12.

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AHR 50904-3
OPERATION 1300

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

S 8447

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM V011		FLIGHT	4:30 p.m.	MO 7 DA 23 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	4		401	
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	BAND 3 POST AMP	SD904	[illegible]	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RR ☐ RADIATION ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ____ ☐ TEMP 15 °C ☐ THERMAL VAC ____ HRS AT ____ ° ☐ OTHER

14. DESCRIPTION OF FAILURE: CHANNELS 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 14, 15 & 16 FAIL TO MEET TRANSIENT AND/OR FREQUENCY RESPONSE REQUIREMENTS

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION ☐ SHEET USED
16597	4.6	A. C. DAVISON		7-24-81	

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS

19. FAILED ITEM NAME AND PART NUMBER

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: PLACE THE FOLLOWING RESISTORS ON STANDOFFS AND RESELECT: R2, 3, 4, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 66 67, 68, 70, 72, 73, 74, 75, 76, 77, 78, 79 AND R80.

21. AUTHORIZATION | ORG | DATE | 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

21. REWORK/RETEST ACTION TAKEN: Reselection was done after being moisture from FPA and continued flow of N2 was established to keep the FPA dry. Components as called out listed on TR-[illegible]-832 no operation to any components.

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Moisture was condensing on the FPA during select testing due to inadequate N2 gas flow onto the FPA. N2 flow has been increased and is now directed to FPA.

W-I-T (ATTACHED) DC-12-23-81

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: W-I-T (COPY ATTACHED) DC 12-23-81

33. FRB CLOSURE: 1-19-81

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☒ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☒ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☒ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
	2122	11/18/81		22-41	12/18/81
39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER		DATE
	51-41	12-18-81			

12/22/81

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FAILURE REPORT

S 8456

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
THEMATIC MAPPER		FLT	16:30	MO 11 DA 11 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☑ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☑ CARD	VERIFICATION REGISTER	50948	201	
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☑ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☑ TEMP 0°C ☐ THERMAL VAC ____ HRS AT ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: WORD 6 FAILED ONCE DURING DATA CYCLING AT 0°C (6X10⁶ CYCLES)
PRIMARY WORD 6 OUTPUT IS X'BD' SHOULD BE X'AD'.

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION SHEET USED
16422	5.4.13	[illegible]	22-13	11/11/81	☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: NOTE FR 8309 AND SUBSEQUENT AMBIENT TESTING DEALT WITH U31 PIN 7 (6 OUTPUT) SHORT TO GROUND BY SOLDER SPLASH ACROSS TRACES, ITS REMOVAL, AND PROPER FUNCTIONING. THE FAILURE OF 1 OF 8 BITS IN WORD 6 ONCE IN 6X10⁶ CYCLES AT 0°C REQUIRES REMOVAL & REPLACEMENT OF U31

19. FAILED ITEM NAME AND PART NUMBER: U31 - 54L165 = 909940-1

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: REMOVE & REPLACE U31 (909940-1)
RETEST PER TP 16422 PARA 5.4.3

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION SHEET USED
J A Banach	22-13	11/12/81	☐

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: U31 REPLACED BY SUPPL. B & RETEST PER 5.4.3 PERFORMED AND NO FAILURES OCCURRED

24. QA REWORK: 110

25. QA RETEST: 110

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
909940-1	U31					

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION SHEET USED
M. GUERRA	22-74	12 NOV '81	[illegible]	22-13	17 NOV '81	☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: POSSIBLE U31 MARGINAL FAILURE DUE TO U31-7 TO U31-8 SHORT; OR DUE TO HEATING TRACES AS PREVIOUSLY NOTED SOLDER SPLASH WAS REMOVED. PROBABLE ACTUAL CAUSE OF U31 FAILURE NOT CLEARLY KNOWN. PER FAILURE ANALYSIS REPORT ATTACHED THE U31 DEVICE WAS A RANDOM FAILURE WHICH MADE IT IMPOSSIBLE TO DETERMINE THE CAUSE. REF FR 8309 COPY ATTACHED). NO OVERSTRESS OCCURRED

31. CONTINUATION SHEET USED ☐

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: FAILURE ANALYST REPORT #9242 (COPY ATTACHED)

33. FRB CLOSURE: 1/6/82

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☒ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☒ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
J A Banach	22-13	11-17-81	[illegible]	2241	6 Jan 82
39. RELIABILITY [illegible]	51-41	1-6-82	40. CUSTOMER OR SUPPLIER		DATE

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1/7/82

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DIVISION

FAILURE ANALYSIS REPORT

58456

FAR No. 9242
Program T.M.

DATE OF RECEIPT 12-9-81
REQUESTER F. Carle
ORG 44-29 PHONE 80248 BLDG./MS S13/D329
REA _____ PHONE _____

TSD PROJECT ENGINEER W. Gettys
PHONE _____ BLDG./MS STD/C346
GLA/CMER 40833

COMPONENT I.C.
FUNCTION/TYPE 8-Bit Shift Register
GENERIC P/N 54L165
HUGHES P/N 909940-1
MFG. National P/N RD30371
DATE CODE 7827 S/N 1092

FAILURE REFERENCE FA81-281/FR S8456
DATE OF FAILURE 11-11-81
FAILURE LEVEL Assembly
LOT NUMBER _____
CIRCUIT SYMBOL U31
MODULE 50948 S/N 201

ABSTRACT

The reported failure, wrong output once in 6 X 10^6 cycles and again once in 1.5 X 10^6 cycles, was not confirmed. The device was found to be within all specified d.c. parametric limits. The rareness of the failure reported made it impossible to determine its cause.

TECHNICAL COMMENTARY
☒ NOT REQUIRED
☐ APPENDED

M. J. Ditz	K2127	D. E. Limbacher	12-22-81
FAILURE ANALYST	JOURNAL	APPROVAL	DATE

S8456

Reported Failure:

"Word G failed once during data cycling at 0°C (6 X 10^6 cycles). Primary word G is X 'BD' [hexadecimal coded output], should be X 'AD'.

Background Information:

"Note FR 8309 and subsequent ambient testing delt with U31 pin 7 ($\overline{Q}$ output) short to ground by solder splash across traces, its removal, and proper functioning. The failure of 1 of 8 bits in word G once in 6 X 10^6 cycles at 0°C requires removal and replacement of U31."

Additional Information:

The device was retested the next day (after the one failure in (6 X 10^6 cycles) for 1.5 X 10^6 cycles. The same failure mode (output X 'BD' instead of X 'AD') was noted again once in the 1.5 X 10^6 cycles.

Outline of Analysis:

1. External Visual Examination
2. Electrical Testing
3. Internal Examination

Results of Analysis:

1. External Visual Examination.

   a) Markings: (National Logo) 7827
   RD30371
   ·1092

   b) Case Examination:

   The leads were formed and solder tipped and there was orange transparent tape on the bottom of the package. No anomalies were noted externally.

2. Electrical Testing.

   The device was tested for d.c. parameters on the Tektronix S-3260 automated I.C. tester per the 909940 specification at +125°C +25°C, 0°C and -55°C. It was found to be within the specified limits for all of the parameters tested.

3. Internal Examination.

   The device was opened and examined internally. No anomalies were noted.

Conclusion:

The reported failure was improper output once in 6 X 10^6 cycles and again once in 1.5 X 10^6 cycles. The device was tested for all specified d.c. parameters and passed. No anomalies were noted externally or internally. The extreme rareness of the observed failure made it impossible to determine its cause.

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FAILURE REPORT

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S 8460

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM		FLT	6:00	MO 10 DA 2 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☒ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	Electronic Module	52347		
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	Auxillary Circuit Board	52797		
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: Signal was inverted at pins 177, 178, 175, 176, 179, 180, 173, and 174
No signal was present at pins 77, 78, 79, 80, 75, 76, 81, 82

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION
16596	5.3	Joe Kleeburg	22-13	10/3/81	☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: INTEGRATED CIRCUITS AR1 and AR2 assembled and installed upside down. No overstress to other board components. Laporatie 11/1/81
STRESS ANALYSIS DOCUMENTED ON IDC #5536-7282. (COPY ATTACHED)
4/30/81

19. FAILED ITEM NAME AND PART NUMBER: AR1, AR2 909992-1

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Remove and Replace correctly AR1 and AR2.
Perform test procedure 16596 Rev A para 5.2 and 5.3

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION
J A Banach	22-13	10-6-81	☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: AR1 and AR2 removed and replaced per D/p.
Retested per test procedure 16596 Rev A para 5.2 and 5.3.

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
909992-1	AR1, AR2				NONE - INSTALLED POWERED INCORRECTLY	

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION
L. Torres	22-74	10-5-81	Joe Kleeberg	22-73	10-6-81	☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: AR1 and AR2 installed incorrectly.
More cautious initial visual check would identify problem prior to powering board.
MEETINGS WERE HELD WITH MFG AND QA PERSONNEL TO REVIEW THIS PROBLEM TO PREVENT REOCCURRENCE.

31. CRB CLOSURE: 11/3/81

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☒ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE — 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
J A Banach	22-73	10-7-81		2261	11/3

39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
	51-4	11-3-81		12/2/81

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FAILURE REPORT

S 8464

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM PL 1162		F1	1615	MO 6 DA 27 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☒ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	Postamp Board			
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	BAMA 1	50904-1	101	
10. ☐ MODULE ☐ MICAM ☒ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☒ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ☐ THERMAL VAC ____ HRS AT ____ AXIS FOR ____ VIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: R1 offset out of spec. Should be -4.00 ± 0.20V DC. Are-

Ch: 3 4 6 10 14 15

V: -4.26V -4.46 -4.34 -7.17 -4.23 -4.55.

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION SHEET USED
32015	512	Current	22-17	82-06-27	☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: No overstress was induced. No parts failed. All components were within Spec. limits. Unit was in test configuration.

19. FAILED ITEM NAME AND PART NUMBER:

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE

Repeat Resistor selection process and retest.

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION SHEET USED
K. Emma for N Current	22-13	6/28/82	☐

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: New select resistors were installed. Retested successfully on 6-28-82

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
908600-256	R-18				None	
908600-88	R-98				"	
908600-253	R-24				"	

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION SHEET USED
L.C. Tolles (GPD)		6/29/82	K Emma for M Hunter	22-13	6-28-82	☒

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: INITIAL RESISTOR SELECTION ALLOWED A BUILD UP OF TOLERANCE TO DRIVE OFFSETS OUT OF SPEC. FOR CH 3, 4, 6, 14, & 15. CH 10 WAS APPARENTLY A POOR CHOICE OF INITIAL RESISTOR, ALTHOUGH STILL WITHIN RANGE. NEW VALUES RESELECTED FOR R 18, 98, 24, 104, 26, 106, 27, 107, 29, 109, 31, AND 111.

31. FRB CLOSURE: 6/30

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE									DEFECT CODE
	☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS	☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP	☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP	☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT	☐ UNKNOWN	

35. FAILURE TYPE		36. FAILURE CLASSIFICATION		
☐ PRIMARY ☐ INDUCED	☒ UNKNOWN ☐ NO FAILURE	☐ CRITICAL ☐ MAJOR	or ☒ MINOR ☐ SAFETY	

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
K Emma for N Current	22-13	6/29/82		224	6/30/82
39. RELIABILITY: A. Perkins	ORG 51 41	DATE 6-29-82	40. CUSTOMER OR SUPPLIER		DATE 7/9/82

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TEST DATA RECORD

NOTE: VALUES ARE FROM LISTS 52732-22 (R17→R32) & 52732-85 (R97→R112)

DATE 6/23/82 (1) & MS

SCANNER F1 BAND 1

4.2 SELECT RESISTOR VALUES

Band (1) 908 #

			VALUE	DESIRED VALUE (kΩ)	ACHIEVED TOTAL (kΩ)
R 17	908600	-252 ✓	20.5K	20.9K ✓	20902
R 97		-88 ✓	402		
R 18		-256 ✓	22.6K	23.1 ✓	23099
R 98		-97 ✓	499		
R 19		-258 ✓	23.7K	23.8 ✓	23.800
R 99		-30 ✓	100		
R 20		-250 ✓	19.6K	19.8 ✓	19.800
R100		-59 ✓	200		
R 21		-251 ✓	20.0K	20.1 ✓	20100
R101		-30 ✓	100		
R 22		-254 ✓	21.5K	21.5 ✓	21.500
R102		SHORT ✓	0		
R 23		-258 ✓	23.7K	24.2 ✓	24199
R103		-97 ✓	499		
R 24		-254 ✓	21.5K	21.5 ✓	21.5
R104		SHORT ✓	0		
R 25		-258 ✓	23.7K	24.0 ✓	24001
R105		-76 ✓	301		
R 26		-256 ✓	22.6K	22.7 ✓	22700
R106		-30 ✓	100		
R 27		-258 ✓	23.7K	23.8 ✓	23.800
R107		-30 ✓	100		
R 28		-256 ✓	22.6K	22.7 ✓	22.700
R108		-30 ✓	100		
R 29		-254 ✓	21.5K	21.8 ✓	21.801
R109		-76 ✓	301		
R 30		-253 ✓	21.0K	21.1 ✓	21100
R110		-30 ✓	100		
R 31		-255 ✓	22.1K	22.5 ✓	22502
R111		-89 ✓	402		
R 32		-253 ✓	21.0K	21.1 ✓	21,100
R112		-30 ✓	100		

OK L.S.D.

SIZE	CODE IDENT NO	NUMBER
A	11323	17010

SCALE | REV A | SHEET 4 OF 5

Ref. F/R #8464
RE-SELECTS. operation 300 of Supp #5 (S0904-1).

TEST DATA RECORD

DATE 6/28/82

SCANNER 51065 S/N 003 (S0904-1 Sh 101)

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4.2 SELECT RESISTOR VALUES

Band 908600-	1	2	3	4
R 17				
R 97				
R18 — 256	22.6 K			
R98 — 88	402 Ω			
R 19				
R 99				
R 20				
R100				
R 21				
R101				
R 22				
R102				
R 23				
R103				
R24 — 253	21.0 K			
R104 — 88	402 Ω			
R 25				
R105				
R 26 — 256	22.6 K			
R106 — 30	100 Ω			
R 27 — 258	23.7 K			
R107 - 30	100 Ω			
R 28				
R108				
R29 — 251	20.0 K			
R109 — 97	499 Ω			
R 30				
R110				
R31 — 255	22.1 K			
R111 — 30 76	301 Ω			

gw.

Shanahan
6-28-82

C. A. Lane
06-28-82

TRC
06-28-82

SIZE	CODE IDENT NO.	NUMBER
A	11323	17010
SCALE	REV A	SHEET 4 OF 5

4.2 Offset Voltage Measurements after Select Resistors Installed.

Band	1	2	3	4
Ch				
1	—			
2	—			
3	-4.16			
4	-4.01			
5				
6	-3.99			
7	—			
8	—			
9	—			
10	-3.99			
11	—			
12	—			
13	—			
14	-4.12			
15	-4.06			
16	—			

Technician Shankar 6-28-82 Date 6-28-82

QA [signature] Date 6-28-82

REA Shankar Date 6-28-82

Ref FR#8464
Test Verification Supp#15 operation#900

SIZE	CODE IDENT NO.	NUMBER
A	11323	17010

SCALE | REV A | SHEET 5 OF 5

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EL SEGUNDO, CALIFORNIA

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FAILURE REPORT

CONTINUATION SHEET

FR SERIAL NO. S8464

CONTINUATION SHEET LETTER* A

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN, DATE EACH ENTRY.

ADDITIONAL FR CONTINUATION SHEET(S) USED ☐

26	PT. No.	CIRCUIT SYMBOL	PROBABLE DEFECT
	908600-88	R104	None
	908600-256	R26	"
	908600-30	R106	"
	908600-258	R27	"
	908600-30	R107	"
	908600-251	R29	"
	908600-97	R109	"
	908600-255	R31	"
	908600-111	R-76	"

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S 8464

TEST DATA RECORD

NOTE: VALUES ARE FRO
LISTS 52732-22 (R17→R32)
& 52732-85 (R97→R112)

DATE 6/23/82 (1) & MS

SCANNER F1 BAND 1

4.2 SELECT RESISTOR VALUES

Band (1) 908 #

		VALUE		DESIRED VALUE (kΩ)	ACHIEVED TOTAL (kΩ)
R 17	908600	-252 ✓	20.5K	20.9K ✓	20902
R 97		-88 ✓	402		
R 18		-256 ✓	22.6K	23.1 ✓	23099
R 98		-97 ✓	499		
R 19		-258 ✓	23.7K	23.8 ✓	23800
R 99		-30 ✓	100		
R 20		-250 ✓	19.6K	19.8 ✓	19810
R100		-59 ✓	200		
R 21		-251 ✓	20.0K	20.1 ✓	20100
R101		-30 ✓	100		
R 22		-254 ✓	21.5K	21.5 ✓	21500
R102		SHORT ✓	0		
R 23		-258 ✓	23.7K	24.2 ✓	24199
R103		-97 ✓	499		
R 24		-254 ✓	21.5K	21.5 ✓	21.5
R104		SHORT ✓	0		
R 25		-258 ✓	23.7K	24.0 ✓	24001
R105		-76 ✓	301		
R 26		-256 ✓	22.6K	22.7 ✓	22700
R106		-30 ✓	100		
R 27		-258 ✓	23.7K	23.8 ✓	23800
R107		-30 ✓	100		
R 28		-256 ✓	22.6K	22.7 ✓	22700
R108		-30 ✓	100		
R 29		-254 ✓	21.5K	21.8 ✓	21801
R109		-76 ✓	301		
R 30		-253 ✓	21.0K	21.1 ✓	21100
R110		-30 ✓	100		
R 31		-255 ✓	22.1K	22.5 ✓	22512
R111		-88 ✓	402		
R 32		-253 ✓	21.0K	21.1 ✓	21,100
R112		-30 ✓	100		

ok L.P.

SIZE	CODE IDENT NO	NUMBER
A	11323	17010

SCALE | REV 4 | SHEET 4 OF 5

58464

Ref. F/R #8464
Re-selects operation 300 of Supp 15 (50904-1).

TEST DATA RECORD

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DATE 6/28/82

SCANNER 51065 S/N 0003 (50904-1 s/n 101)

4.2 SELECT RESISTOR VALUES

Band 908600-	1	2	3	4
R 17				
R 97				
R18 — 256	22.6 K			
R98 — 88	402 Ω			
R 19				
R 99				
R 20				
R100				
R 21				
R101				
R 22				
R102				
R 23				
R103				
R24 — 253	21.0 K			
R104 — 88	402 Ω			
R 25				
R105				
R 26 — 256	22.6 K			
R106 — 30	100 Ω			
R 27 — 258	23.7 K			
R107 - 30	100 Ω			
R 28				
R108				
R29 — 251	20.0 K			
R109 — 97	499 Ω			
R 30				
R110				
R31 — 255	22.1 K			
R111 — 30 76 9th	301 Ω			

Shanahan
6-28-82

C. R. Lee
06-28-82

T. Dunham
06-28-82

SIZE	CODE IDENT NO.	NUMBER
A	11323	17010
SCALE	REV A	SHEET 4 of 5

58464

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4.2 Offset Voltage Measurements after Select Resistors Installed.

Band	1	2	3	4
Ch				
1	—			
2	—			
3	-4.16			
4	-4.01			
5				
6	-3.99			
7	—			
8.	—			
9	—			
10	-3.99			
11	—			
12	—			
13	—			
14	-4.12			
15	-4.06			
16	—			

Technician CH 06-28-82 Shanahan Date 6-28-82

QA [signature] Date 6-28-82

REA Shanahan Date 6-28-82

Ref FR#8464
Test Verification Supp#15 operation#900

SIZE	CODE IDENT NO.	NUMBER
A	11323	17010
SCALE	REV A	SHEET 5 OF 5

SECTION 2.13
CABLE HARNESS

2.13.1 Cable Harness

2.13.1.1

No performance data was taken at the subsystem level on this subsystem.

2.13.2
Acceptance Data

2.13.2.1
Configuration Lists

AS-BUILT CONFIGURATION LIST

R=RECORD CHANGE

CABLE ROUTING ASSY
52348(3569647)S/N005

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
01	52348	CABLE ROUTING ASSY	F 3844A	F 3844A	F 3844A	005
01	3569647	WIRING HARNESS INSTALLATION	C 27724 70534 70538 70543 70550 70561	C 27724 70534 70538 70543 70550 70561	C 27724 70534 70538 70543 70550 70561	005
02	3569641	WIRING HARNESS	E 27722 27723 D042 REV1 D057 D060 D062 D063	E 27722 27723 D042 REV1 D057 D060 D062 D063	E 27722 27723 D042 REV1 D057 D060 D062 D063	005
03	DP50326	DPS ASSY OF AMP CONNECTORS	B SCN 1 2 3 4	B SCN 1 2 3 4	B SCN 1 2 3 4	
02	3569642	WIRE, JUMPER	9494	9494	9494	
02	3569643	CONNECTOR	- D064	- D064	- D064	

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
02	3569646	WIRING DIAGRAM	B 27727 27732 R70552 70557 70564 70567	B 27727 27732 70557 70564 70567	B 27727 27732 70552 70557 70564 70567	
02	3569649	RF BACKSHELL	-	-	-	
02	3449442	EYELET	-	-	-	
02	ICL3569638-1	INTERCONNECT LIST	A 27721 27726 27735 27737	A 27721 27726 27735 27737	A 27721 27726 27735 27737	
02	TP32015-036-1	TP OF ELECTRICAL WIRING HARNESS	A SCN 1 27738	A SCN 1 27738	A SCN 1 27738	
02	16232	CABLE, SHIELDED	A	A		
02	52349	STRUCTURE ASSY-ELECT.	C 1987A	C 1987A	C 1987A	
02	52361	GASKET, CONNECTOR	A 8151	A 8151	A 8151	
02	52365	PLATE, CONNECTOR-RIU	A 1961A 3275A	A 1961A 3275A	A 1961A 3275A	
02	52366	PLATE CONNECTOR	A 8065	A 8065	A 8065	
02	52753	THERMISTOR BLOCK	D 3794A	D 3794A	D 3794A	301

52348(3569647) S/N005

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
02	52839	CONNECTOR, RECEPTACLE	D 2087A 2748A	D 2087A 2748A	D 2087A 2748A	
02	52930	CAP & RELAY BD ASSY	E 2977A 3807A	E 2977A 3807A	E 2977A 3807A	202
02	53160	TERMINAL BD ASSY	B	B	B	201
02	53653	PLATE, FILTER MOUNT	A	A	A	
02	53710	TERMINAL BD POWER	C 3255A	C 3255A	C 3255A	
02	53711	PLATE, POWER SUPPLY	A	A	A	
02	53927	GROMMET, PLASTIC EDGE	A	A	A	
02	52923	TERMINAL BD ASSY	B 9369	B 9369	B 9369	201
02	54012	HEATER ASSY	A 2398A	A 2398A	A 2398A	201
02	54185	RETAINER, CABLE	A 1886A	A 1886A	A 1886A	
02	54233-1	SW THERMOSTAT ASSY	A 3504A	A 3504A	A 3504A	202
02	54257	+/-2 SMA CONTROL RES	A 2925A	A 2925A	A 2925A	203
02	653307	TERMINAL LUG, SOLDER	—	—	—	
02	16268	PS FOR SURFACE MOUNTED COMPONENTS	A 2216A 2940A 3080A 3283A	A 2216A 2940A 3080A 3283A	A 2216A 2940A 3080A 3283A	

R. A. Crowes CDMO

Quality Assurance

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HARNESS

P/N 52348

FLIGHT

Failure Reports Number	
Open	Closed

Deviation	Waivers

HARNESS

P/N 52348

FLIGHT Failure Report No.		PROTOFLIGHT Failure Report No.		ENGINEER Failure Report No.	
Open	Closed	Open	Closed	Open	Closed
			F3022 F3023 F3024 F5190 F8022		

Listing of Liens

There were no liens recorded against the Harness Assembly.

END

DATE

FILMED

AUG 5 1983